

CONTRIBUTORS TO THIS NUMBER

E. WYLLYS ANDREWS, M. D., Professor of Surgery, Northwestern University Medical School; Chief of Staff, Mercy Hospital, Chicago, Surgeon in Chief, Cook County Hospital, Chicago; Attending Surgeon, Michael Reese Hospital, Chicago.

CARL BECK, M. D., Surgeon, North Chicago Hospital.

ARTHUR DEAN BEVAN, M. D., Professor of Surgery at Rush Medical College in Affiliation with the University of Chicago, Surgeon to the Presbyterian Hospital, Chicago.

DANIEL N. EISENDRATH, M. D., Professor of Surgery, College of Medicine, University of Illinois; Attending Surgeon, Michael Reese and Cook County Hospitals, Chicago.

ALBERT EDWARD HALSTEAD, M. D., Professor of Surgery and Clinical Surgery, School of Medicine, University of Illinois; Senior Surgeon, St. Luke's Hospital, Chicago; Consulting Surgeon, Illinois Charitable Eye and Ear Infirmary.

MALCOLM L. HARRIS, M. D. Professor of Surgery, Chicago Polyclinic, Surgeon to Alexian Brothers, Henrotin, Passavant, and Polyclinic Hospitals, Chicago.

HERMAN L. KRETSCHMER, M. D., Urologist, Presbyterian Hospital, Assistant in Genito-urinary Surgery, Rush Medical College, Chicago.

HUGH McKENNA, M. D., Senior Surgeon and President of Staff, St. Joseph's Hospital, Chicago; Associate Professor of Surgery (Extramural), Rush Medical College.

HARRY E. MOCK, M. D., Surgical Staff of St. Luke's Hospital, Chicago.

ALBERT J. OCHSNER, M. D., LL.D., Surgeon in Chief, Augustana Hospital and St. Mary's Hospital, Chicago; Professor of Clinical Surgery in the Medical Department of the State University of Illinois.

NELSON MORTIMER PERCY, M. D., Attending Surgeon, Augustana Hospital, Chicago; Attending Surgeon, St. Mary of Nazareth's Hospital, Chicago. Associate Professor of Clinical Surgery at College of Medicine and Surgery, University of Illinois.

D. B. PHEMISTER, M. D., Associate Attending Surgeon, Presbyterian Hospital, Chicago.

JOHN RIDLON, M. D., Consulting Orthopedic Surgeon, Michael Reese Hospital and Mercy Hospital, Chicago, Chief Surgeon, Home for Convalescent Children, West Chicago, Illinois.

KELLOGG SPEED, M. D., Associate in Surgery, Northwestern University Medical School; Associate Surgeon, Mercy Hospital, Chicago; Surgeon to Provident and Cook County Hospitals, Chicago.

DAVID C. STRAUS, M. D., Assistant in Surgery, Rush Medical College; Associate Attending Surgeon, Michael Reese Hospital, Chicago.

THOMAS J. WATKINS, M. D., Professor of Gynecology, Northwestern University Medical School; Gynecologist, St. Luke's Hospital, Chicago.

CONTENTS

Clinic of Dr. Arthur Dean Bevan, <i>Presbyterian Hospital</i> BENIGN TUMORS OF THE BREAST, CHRONIC INFLAMMATIONS AND CARCINOMA CARCINOMA OF THE BREAST	PAGE 889 901
Clinic of Dr. Arthur Dean Bevan, <i>Presbyterian Hospital</i> BENIGN TUMORS OF THE BREAST, CHRONIC INFLAMMATIONS AND CARCINOMA CARCINOMA OF THE BREAST	TREATMENT BY 913 917 921
Clinic of Dr. John Ridlon, <i>Mercy Hospital</i> HIP DISEASE	935
Clinic of Dr. Albert E. Halstead, <i>St. Luke's Hospital</i> HEREDITARY DEFORMITY OF THE CERVICAL DYSPLASIA	951
Clinic of Dr. Malcolm L. Harris, <i>Henrotin Memorial Hospital</i> HERNIA OF THE BREAST	959
Clinic of Dr. E. Wyllys Andrews, <i>Mercy Hospital</i> HERNIA OF THE BREAST, INFLAMMATION OF THE CERVICAL DYSPLASIA, TREATED BY ROLLING BACK INJECTIONS AND HOT METAL POINT	965
Clinic of Dr. Dallas B. Phenister, <i>Presbyterian Hospital</i> BRAIN CYST FOLLOWING SKULL FRACTURE	971
Clinic of Dr. Nelson M. Percy, <i>Augustana Hospital</i> PARTIAL ECTERIZATION THROUGH VAGINA DURING ATTEMPTED ABORTION	979
Clinic of Dr. Carl Beck, <i>North Chicago Hospital</i> TENDON AND NEUROPLASTY ELEPHANTIASIS AND ITS TREATMENT BY THE HANLEY OPERATION	983 993
Clinic of Dr. Herman L. Kretschmer, <i>Alexian Brothers Hospital</i> HYDRONEPHROSIS DUE TO KIDNEY STONE REMARKS ON THE DIAGNOSIS AND TREATMENT OF RENAL CALCULUS URETERAL CALCULUS REMOVAL BY INTRA UTERINE INJECTIONS OF OIL	999 1011
Clinic of Dr. Daniel N. Elsendorath, <i>Cook County Hospital</i> THE COMPLICATIONS OF APPENDICITIS TWO CASES ILLUSTRATING THE CLINICAL IMPORTANCE OF CONGENITAL ANOMALIES OF THE KIDNEY	1021 1031 1035 1053
Clinic of Dr. Hugh McKenna, <i>St. Joseph's Hospital</i> A CASE OF PERFORATED DUODENAL ULCER EARLY RECOGNITION AND TREATMENT OF ACUTE APPENDICITIS	1063 1069
Clinic of Dr. Harry E. Mock, <i>St. Luke's Hospital</i> A CASE OF BICOLORIC OF MERCURY POISONING DIAGNOSED AS AND OPERATED ON FOR, PERFORATED GASTRIC ULCER	1077
Clinic of Dr. David C. Straus, <i>Michael Reese Hospital</i> HAMMER TOE HAMMER TOE—MODIFIED JONES OPERATION WITH DETAILS OF THE TECHNIC	1081 1091
Clinic of Dr. Kellogg Speed, <i>Cook County Hospital</i> HEMATURIA IN APPENDICITIS	1097

SURGICAL CLINICS OF CHICAGO

Volume 1

Number 5

CLINIC OF DR. ARTHUR DEAN BEVAN

PRESBYTERIAN HOSPITAL

BENIGN TUMORS OF THE BREAST, CHRONIC INFLAMMATIONS, AND CARCINOMA

Summary: Two clinics illustrating the surgical pathology, the differential diagnosis, and the treatment of breast tumors and of chronic inflammatory swellings.

BENIGN TUMORS OF THE BREAST AND CHRONIC INFLAMMATORY SWELLINGS

I WANT to show you this morning 3 interesting cases representing different types of benign tumors of the breast. Before operating upon the first case I want to go over this subject briefly so as to give you a rather broad picture of these benign tumors as we have found them in our own clinical work.

First of all, I should like to say that contrary to the older teaching that benign tumors were comparatively rare in the breast and that nine-tenths of breast tumors were malignant, we have found at least as many benign tumors as malignant. During the last few years there has been an increasing proportion until today I believe that we are seeing more benign tumors of the breast than malignant ones.

In regard to the varieties that are met with, we, of course, find tumors corresponding to all the different tissues that go to make up the mammary gland—lipomas, angiomas, fibro-adenomas, and cystadenomas being the most common.

I would, as the result of personal experience, suggest the following simple classification of tumors of the breast:

The common benign tumors come under the head of fibro-adenomas and cystadenomas. These include the Schimmelhush tumors, the benign papillomas, and the benign cysts.

The rarer benign tumors of the breast are the angiomas, lipomas chondromas osteomas, atheromas, and dermoids

The malignant tumors are the carcinomas and sarcomas Under the general term "carcinoma" I would include carcinomatous cysts and malignant papillomas In our own work we have certainly had more than 20 carcinomas to 1 sarcoma I am led to regard sarcoma of the breast, from our own experience, as a comparatively rare neoplasm

Looking at the clinical problem in the simplest way I would say that fibro and cystadenomas and carcinomas form certainly more than 95 per cent of the breast tumors that come to our service Therefore, the question that as a rule, must be answered when a woman with a breast tumor presents herself for diagnosis is, "Is this a carcinoma or a fibro- or cystadenoma?"

Of the benign tumors the commonest forms are the fibro-adenomas, tumors with a definite capsule composed of fibrous tissue containing tubules lined with epithelium, the proportion of fibrous tissue and epithelial elements varying in different cases Next to the fibro-tissue and adenomas in point of frequency come the cystic tumors of the breast These are sometimes simple cysts, lined with epithelium and containing clear, yellowish, or turbid fluid For the most part they are true cysts and not retention cysts Occasionally we find one of these cysts which has at one point in the wall a beginning carcinoma In these cases we find, as a rule, the fluid is bloody which is suggestive of such a carcinomatous condition In addition to the simple single cysts we find occasionally papillomatous cysts and cysts containing warty ingrowths These may be either benign or malignant, as we find in papilloma of the ovary

There is in point of frequency a third group which comes under the head of Schummelbusch tumors These were regarded by the older surgeons and pathologists as the results of chronic mastitis until Schummelbusch pointed out to the satisfaction of most of us that these tumors are true neoplasms and not the result of a chronic inflammatory process A Schummelbusch tumor is made up of a great number of cysts varying in size from very small cysts the size of a pea to cysts as large as an

English walnut. The process is sometimes limited to a small part of the gland, and in other cases it involves a large portion of the mammary gland, sometimes the entire gland being involved in the neoplasms. My own impression is that these Schimmelbusch tumors are essentially benign and we have found little tendency to regional or metastatic involvement, and where the tumors have been widely excised the prospects of permanent cure without further invasion of the breast are excellent. There are, however, some of these tumors, consisting of a great number of cysts containing papillomatous ingrowths, which are malignant in the same sense that many papillomas of the ovary are malignant, and, like papillomas of the ovary, they shade from purely benign tumors through all grades to those that are intensely malignant.

There is another class of tumors which consist of epithelial growths in the mammary gland, tubules, and in the milk-ducts. These are very apt to be associated with a clinical picture of bleeding from the nipple, the hemorrhage coming from the papillomatous growths in the ducts. These must be classed on the borderline between benign and malignant neoplasms. My colleague, Dr. Dean Lewis, has described these tumors in an article on Bleeding Nipples.¹

On the whole, it is not difficult to make a differential diagnosis between benign tumor of the breast and malignant tumor in all but a small number of cases, the one important differential point being that the malignant tumors infiltrate the surrounding mammary gland tissue, so that they give one the sense of being embedded in the tissue, frozen into the tissue, and having finger-like processes radiating out from the primary focus, making a fixation of the tumor so that it cannot be moved freely in the gland tissue. A benign tumor, on the other hand, gives one no such sense of infiltration into the surrounding tissue. A fibro-adenoma or simple cyst or Schimmelbusch tumor can be easily moved in the mammary gland tissue, and this one point alone is, as a rule, sufficient to make a differential diagnosis. Not infrequently benign tumors are multiple, and, as you

¹ Surgery, Gynecology, and Obstetrics, 1916, xxii, p. 666.

all know multiple carcinomas of the breast are exceedingly rare. In fully 90 per cent of the women who come to me with benign tumors I unhesitatingly make a definite clinical diagnosis stating to them that they have a tumor of the breast but because of its movability it is almost certainly benign. In the small minority where the evidence is not definite I make the statement that I cannot tell what the character of the tumor is until it is removed and examined microscopically. What advice are we to give a woman who comes to us with an apparently benign tumor of the breast? I think as a rule these tumors should be removed. The one great important matter to settle is that of the exact character of the tumor and thus of course can be done by removing it and submitting it to microscopic section. There are a few cases where the evidence in favor of benignancy is so definite and where the tumors are movable and of small size and not disfiguring where we can very properly assure the patient that the tumors are benign and advise against any operative procedure unless they grow to a size which in itself is annoying.

I am quite willing to accept the general proposition that a woman with a breast tumor should be operated upon even though in all probability the tumor is benign. This is of service in two ways—it settles the diagnosis definitely and removes what is in many cases a definite source of worry.

In regard to the surgical technic I shall this morning have an opportunity of illustrating the special steps of the operations which we employ in this clinic for benign tumors. The first case which I shall operate upon is a young woman of thirty two who presents a small nodule in the right breast about as large as a hazelnut and very movable. She has known of its existence for a number of months. There is no tendency to dimpling of the skin over the tumor. It is not tender. She has had no pain in the breast. There is no enlargement of the axillary glands. I am not absolutely sure as to whether it is a small cyst or a fibro adenoma. It is within about $1\frac{1}{2}$ inches of the nipple and is apparently just under the skin and superficial fascia that is superficially situated in the mammary gland.

In a case of this kind I select a local anesthetic and, as you see, infiltrate the skin and superficial fascia in a line radiating out from the nipple over the center of the tumor for a distance of about 2 inches. I have the assistant fix the mammary gland between the thumb and finger so as to prevent any change in the position of the tumor during the operation. Cutting down through the skin and superficial fascia the tumor comes into view. It has a definite capsule and is hard and firm. With sharp, fine dissection I remove the tumor and its capsule from the surrounding mammary gland tissue. There is a little bleeding from two or three small vessels. This is controlled with artery forceps (Fig. 324).

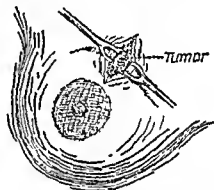


Fig. 324.—Enucleation of small benign tumor under local anesthesia through radial incision.

We have now removed the tumor, and I split it open with a sharp knife and find it is a hard, firm mass of tissue, evidently a fibro-adenoma. The dead space in the mammary gland from which the tumor has been removed is closed with two fine cat-gut sutures. Two very fine cat-gut sutures are used to close the superficial fascia over the gland and the small incision over the tumor is closed with black linen. In a case of this kind where the tumor is small and the hemorrhage is easily controlled I do not employ any drainage, but where we remove large tumors from the breast, leaving a large raw surface, it is, as a rule, best to introduce a small piece of gutta-percha or a small collapsible rubber tube. I leave this in one angle of the incision for twenty-four hours so as to prevent an accumulation of blood or primary wound secretion. We shall, of course, examine this tumor carefully microscopically.

Postscript.—Later the tumor was examined and shown to be a benign fibro-adenoma.

The second case which I shall operate on is that of a woman in whom we have made a diagnosis of a rather large benign tumor,

probably a single cyst. It is situated in the lower outer quadrant of the right mammary gland and is about the size of a hen's egg. It is movable and painless and was discovered recently accidentally while she was bathing. I am not absolutely sure of the diagnosis but it impressed me as probably a large single cyst.

In these cases we have adopted a plan of incision that has been very generally employed for a number of years: a curved incision in the groove at the outer border of and beneath the mammary gland. This incision is covered by the mammary gland when the woman is erect so that it is not visible and is in no way disfiguring. In operations for large breast tumors in which I employ this method of removal I prefer to use a general anesthetic rather than local anesthesia although the operation can be done quite well under local anesthesia. There is however a certain amount of drawing and pulling in turning the breast upside down as we do in the course of the dissection which is uncomfortable to the patient even under a good local anesthetic. Under ether anesthesia therefore I make an incision about $4\frac{1}{2}$ inches in length at the outer and under part of the breast. This divides the skin and superficial fascia and the edge of the mammary gland comes into view. This is pulled up exposing rather loose areolar tissue between the mammary gland and the pectoralis major muscles. This areolar tissue is divided and the mammary gland is turned upside down so that the portion of it containing the tumor is brought out through the incision. This is well shown in the chart which I have on the board (Fig 325). The tumor can be very easily felt. With a sharp knife the mammary gland tissue in immediate contact to it is dissected out. It proves to be as you see a large single cyst the wall of which is lined with shining epithelium and it contains a turbid yellowish fluid. It is quite necessary to use a very sharp knife in these cases because you will be surprised to find how hard the tissue of the mammary gland is. It cuts almost like fibrocartilage.

The large dead space from which this tumor is removed is now closed with medium sized catgut the two or three bleeding points are ligated and the breast is dropped back into its normal

position, and the curved incision at the outer border is closed with some very fine catgut through the superficial fascia and black linen through the skin. I introduce a very small collapsible rubber tube into the middle of the incision. This will be removed at the end of forty-eight hours. I find that this is a good rule,

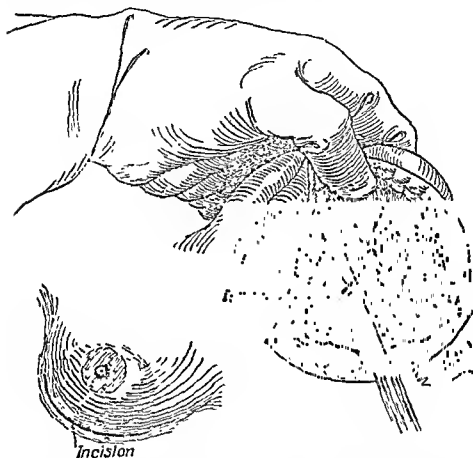


Fig 325.—Enucleation of large benign tumor through incision made beneath breast. The organ may be turned upside down through such an incision and any portion of the gland resected. After healing has occurred the scar is entirely hidden by the breast itself.

because if we do not provide for the escape of some little oozing and primary wound secretion we are very apt to have an accumulation of serum, which will require reopening of the wound at one point so as to permit of its escape, usually some time between the fifth and the eighth day. If, however, a tube is left in for forty-eight hours this is usually avoided.

The third case is a woman upon whom I have ventured to make a diagnosis of Schimmelbusch tumor. She has had the tumor to her knowledge for about three years. It involves at least one third of the mammary gland. It is movable in the mammary gland tissue and at the same time is rather nodular. It does not give one the sense of a simple cyst nor of a fibroadenoma, but rather the sense of a tumor made up of a great many cysts. One can be pretty sure that it is not a carcinoma because of the fact that the young woman has known of its existence for several years, and that there has been little change in the size and shape of the tumor during that time. There is no evidence of glandular involvement. There is an absolute lack of the infiltrating character of a malignant growth.

I shall in this case operate under ether anesthesia. I shall adopt the same plan of incision as in the case just operated upon. I shall make, therefore, a larger incision—about 6 inches in length—at the outer and lower border of the breast and, as I turn the breast upside down to expose its under surface, you can see shining through the thin fascia covering the under surface of the breast a number of small yellowish cysts. The process is so extensive and involves the mammary gland tissue so generally that I cannot do as I did in the last case and simply dissect out the tumor. It will be necessary to remove a large wedge-shaped section of the breast certainly more than one-fourth of the mammary gland, going wide of the tumor and through perfectly normal mammary gland tissue. As you see, the shape of the section removed is very much like the wedge-shaped section that one would make in cutting a piece of pie. We have now removed the entire neoplasm and with medium sized catgut I shall sew the edges of the mammary gland tissue together through the entire thickness of the gland. This controls the hemorrhage and does away with the dead space that would otherwise exist and although we have removed more than one fourth of the entire circumference of the gland there is surprisingly little resulting deformity. As in the previous case, we introduce a rubber tube for drainage and close the incision with catgut and black linen.

On cross-section you see, as I divide this tumor, that it is composed of a great number of cysts varying in size from a pea to a large butter bean. I have no doubt but that the microscopic section will show that it is one of those cases of cystic disease of the breast which we classify as Schimmelbusch tumor.

On the basis of the 3 cases which I fortunately have had the opportunity of showing you this morning I would like to say a few words in regard to the other benign lesions of the breast that simulate tumors and require to be differentiated from them. I would like to mention first tuberculosis of the breast. We have had a number of these cases in the clinic. One of my assistants, Dr. Gatewood, has recently reported them.¹ They offer, as a rule, confusing clinical pictures. Sometimes they are diagnosed as carcinoma, sometimes as benign tumors, and sometimes as abscesses of the breast. They occur, as a rule, as multiple nodules in the breast, and unless associated with a mixed infection, they are not painful and have little redness and swelling about them until they come to the surface of the skin, where, as in similar cold abscesses from cervical lymphatic glands, they may become adherent to the skin, break down, and discharge. Where they occur in individuals who are the subjects of general tuberculosis and the process is somewhat advanced, the diagnosis can be made with a fair degree of certainty. In ordinary cases, however, without such associated evidence the diagnosis is not made until the lesion is operated upon and sometimes not until the microscopic examination of the tissue removed has been made. In the very early stages before they have broken down the lesion is a mass of tuberculous granulations. A little later caseation occurs and the caseating mass is surrounded by a wall of rather dense connective tissue. Where the lesion is single and deeply situated in the breast, occurring in women of cancer age and associated with a certain amount of chronic inflammation around the focus, the picture may be quite suggestive of carcinoma, and I have in several cases operated, with the probable diagnosis of carcinoma, and found one of these single tuberculous nodules. Where they are movable, of course, with the picture

¹ Jour. Amer. Med. Assoc., 1916, Lxvii, p. 1660.

that I have already described, the evidence would be against carcinoma and in favor of tuberculosis

The question of treatment in these cases is rather interesting. We have cured some of them where the process was limited by excision of the portion of the breast tissue involved. In other cases however the process involved so much of the mammary gland tissue that it was necessary to remove the entire gland.

A second picture which we have found in a few cases is that of actinomycosis of the breast secondary, of course to lung actinomycosis and extending through the pleura and through the chest wall to the mammary gland. These cases are confusing and are apt to be mistaken for tuberculosis. The differential diagnosis must be made however upon the finding of colonies of ray fungi in either the pus or tissue removed. There is however one suggestive characteristic that is the wooden like infiltration that is found in actinomycosis generally.

A third condition which we have found in a few cases is that of syphilis of the breast. I have found this both in the male and in the female. I can remember very distinctly 2 cases of this kind that made a great impression upon me. One a man of about forty from whom I removed a breast tumor the size of an almond. It was rather yellowish and firm. I dissected it out completely but after wound repair a considerable induration was left which gradually developed a mass larger than the tumor which I originally removed. On sectioning carefully it was found to be a gumma and the induration entirely disappeared under mixed treatment. The second case was that of a woman who had had one breast amputated for supposed carcinoma several years before. She came to me with a mass in the remaining breast. On going over the case very carefully we found a positive Wassermann and very definite earmarks of general constitutional disease. On that account we put her on mixed treatment before suggesting operative interference and on the mixed treatment the induration in the breast disappeared entirely. It is at least probable that the tumor in the breast which had been operated upon was of the same character.

I cannot leave this subject without referring to another condi

tion of the breast which has interested me very greatly and which for a time seemed to present a very difficult problem, but which I have learned to handle with a good deal of satisfaction, and that is the subject of long-standing chronic inflammatory lesions of the breast associated with multiple abscesses and fistulæ, the result of a pus infection. We have had to deal with this problem a number of times, and I have seen now a good many of these cases which had received treatment in the hands of quite competent men for a good many months, and which would come to us riddled with abscesses and fistulæ, and with the desire of the patient to have a radical operation done and the breast removed rather than to suffer from the continued annoyance and distress of the condition. Where these multiple abscesses and fistulæ of the breast are handled by simple incision and the introduction of drainage-tubes they very often become chronic and are not cured. We have found, however, that they practically all can be cured by a thorough operation under an anesthetic, opening up all the abscess cavities and scraping out all the fistulous tracts, and then not introducing any drainage-tubes, but applying moist dressings under a very firm compression with a bandage. It is surprising how these cases will heal up if firm pressure is made over the breast and the breast kept at rest after the abscesses and fistulous tracts have been thoroughly cureted out. My attention was first called to the importance of a thorough cureting of these abscesses and fistulous tracts and the application of pressure by the late Dr. Charles T. Parkes, who at that time employed the technic which I think was original with him, although I am not sure as to this point. After thoroughly cleaning out these abscesses and fistulous tracts he would apply over the breast a large flat sea-sponge which had been sterilized and flattened under an old-fashioned letter-press. About two of these flattened sea-sponges were put over the breast and held in position by firm gauze bandage and a large dressing. The sea-sponges were moistened with boric solution. These flat sponges which would come out from under the letter-press not more than $\frac{1}{4}$ inch in thickness would swell up to sponges 1 inch or $1\frac{1}{2}$ inches in thickness. They would

exert an even well-distributed pressure over the breast under the bandage. I think this is an excellent plan of applying this treatment. At the same time we have found very admirable results by simply using very massive gauze dressings held very firmly in place by gauze rollers and applied so as to make an even continued pressure. I have in so many cases been able to prevent the removal of one of these chronically inflamed breasts and to cure the patient completely by this rather simple surgical procedure that I should like to emphasize the great value and importance of it in this general discussion of breast lesions.

CARCINOMA OF THE BREAST

THE first case that I shall operate on this morning is a woman of about forty years of age, who comes to the clinic with the history of having noticed a general hardening in the right breast three or four months ago. She went to her family physician, who, on examining the condition, told her that it was a chronic mastitis, gave her some simple directions for treatment, and expressed the opinion that the trouble would disappear in a short time. She now has, as you see, a retraction of the nipple. On superficial examination the breast appears to be very much like the one on the opposite side, but examining it by palpation the breast is found to be very hard, firm, and slightly tender. I cannot make out any enlarged glands in the axilla. There has been no bloody discharge from the nipple and there is no evidence of an eczematous condition about the nipple, as is sometimes noticed in these cases.

My clinical diagnosis here is quite definitely an enormous carcinoma involving almost the entire mammary gland with a resulting retraction of the nipple. We shall proceed to do an extensive radical operation under ether anesthesia. I have little sympathy with doing these radical breast operations under local anesthesia, as is being done by a number of men. I think it is stretching altogether too far the proper field of local anesthesia. We shall, in this radical operation, remove in one block of tissue the skin widely over the mammary gland, the mammary gland itself, the underlying pectoralis major muscle, and the axillary fat and lymphatics. The plan of incision, which we have adopted in this clinic and which we believe is the one best suited for this work, is well represented in Fig. 326. We do not claim any originality in this operation, but feel very strongly that it is, on the whole, the best operation that has been devised for the radical removal of the breast.

As you see, the skin incision begins on the upper part of the arm at the point of insertion of the pectoralis major muscle into the humerus, and is carried downward and inward over the pec-

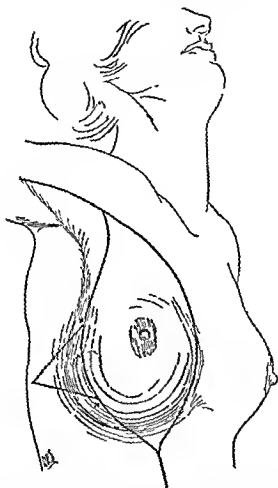


Fig. 326.—Outline of incision for radical operation on breast. Dotted lines indicate method of enlarging incision to include suspicious areas.

toral muscles for several inches, and then divides to include a large area of skin over the mammary gland, and then unites again into a single incision over the point of origin of the rectus abdominis. Where the carcinoma is small and situated close to the

nipple the amount of skin that requires removal is, of course, less than in an extensive carcinoma like this. Wherever possible, I attempt to plan the operation so that the skin incision can be closed completely without any skin-grafting. Where the carcinoma is situated at the periphery of the mammary gland and there is any possibility of the overlying skin being involved, a wedge-shaped area of skin is removed at that point so as to get widely away from the lesion (Fig. 326). As you will see, it is very important in making the skin dissection to dissect the skin back, going very close to the derma, so as to avoid leaving any of the mammary gland tissue. I have now dissected the integument back on the inner side to the sternum and on the outer side as far back as the latissimus dorsi muscle, and I have exposed at the lower angle of the incision the sheath of the rectus abdominis. I am careful in the dissection of the axilla to dissect back a flap of skin as far as the latissimus dorsi and the teres major muscles that form the posterior border of the axilla. I now elevate the pectoralis major muscle from the chest and with curved clamps I clamp the muscle very close to its point of origin from costal cartilages and sternum, and cut the muscle with a strong pair of scissors close to the clamps. I am careful in doing this to clamp the perforating branches of the internal mammary artery firmly with artery forceps opposite the corresponding intercostal spaces. As I come up to the line on the pectoralis major where the sternal and clavicular portions unite I split the muscle-fibers so as to expose the nerves and blood-vessels in the costocoracoid membrane. These are ligated and divided. Passing outward with the knife I divide the insertion of the portion of the pectoral muscle to be removed close to its attachment in the external ridge of the bicipital groove of the humerus. With great care now I expose the axillary vein, which is the guide that is always to be looked for in the dissection of the axilla. It comes into view as this large bluish vessel about the size of my little finger, and is the most superficial of the important structures of the axilla. With two pairs of blunt dissecting forceps and with some gauze I very carefully dissect out all the axillary fat and lymphatics. In doing this it is necessary to

stitches are removed in from eight to ten days, and the small rubber tube in the axilla in from three to four days. The patient is allowed, as a rule, to leave the hospital at the end of ten days.

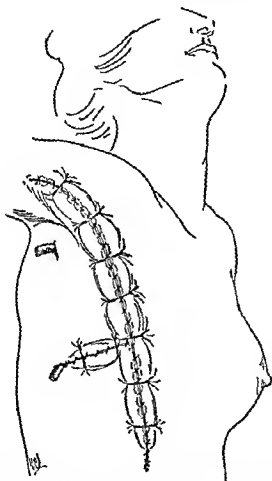


Fig. 328.—Incision closed with interrupted tension sutures of silkworm-gut and continuous skin suture of black waxed silk or linen. Note drainage-tubes (collapsible rubber) in dependent portion of wound.

We have for a long time advised a course of x ray treatments after these breast amputations with the idea that this might give some additional assurance against recurrence. The argu

ment in favor of this position is, I think, sound. We have seen a good many carcinomatous nodules that have developed in the skin after the radical operation of the breast disappear under x -ray exposure. It seems reasonable to suppose that the microscopic nest of cells from which these nodules spring would be destroyed much more easily immediately after the operation than when large palpable nodules manifest themselves. All advice to use x -ray treatments after these operations, however, should be conditioned with the statement that the exposures should be of a character that would carry with them no risk of burning the patient, because we have seen some very bad burns of the breast that caused great distress. On that account I very strongly urge these patients to have x -ray treatment given by some expert and with great care to avoid any possible burning.

What can we say in regard to the prospect of permanent cure? In this particular case I think that we can say that there is practically no prospect of a permanent cure because, when I made the dissection of the axilla, I found visible and definite strands of carcinoma involving the lymphatic vessels way up in the axillary angle just beneath the clavicle. I have learned from experience with 400 or 500 of these cases that that means invariably an extension into the lymphatics in the mediastinum and lymphatics in the neck. I regard an operation in a case with these findings as being purely palliative. It may give the patient a prolongation of life of two or three years, but almost certainly sooner or later continued growth of the carcinoma inside of the chest will make itself evident. In this connection I want to give you a good working rule which will enable you to form a mental picture of the extension of carcinoma through the lymphatics. The rule is this, that if you want to determine accurately and definitely the involvement of the lymphatics from the primary focus of carcinoma, investigate first the arterial supply of the area involved. With the arterial supply you have the return venous circulation, and with the return venous circulation you find the draining lymphatic vessels. Now apply this rule to the mammary gland. What is the arterial supply?

First From the branches of the axillary artery

Second From the intercostal branches of the internal mammary

Third From the lateral branches of the intercostals proper

Fourth but not of very much importance Branches from the deep epigastric passing up from the rectus muscle to the mammary gland

With each one of these four sources of arterial supply you have a return venous supply and draining lymphatics Therefore you find with carcinoma of the mammary gland lymphatic extension first to the axilla accompanying the branches of the axillary vein second lymphatics passing into the anterior mediastinum accompanying the branches of the internal mammary vein, third lymphatics accompanying the intercostal veins to the posterior mediastinum and the lymphatic glands in the posterior mediastinum fourth occasionally the lymphatics passing from the mammary gland downward toward the umbilicus with the deep epigastric vein

My experience with carcinoma of the mammary gland has taught me that the favorable cases are the ones in which there is not as yet lymphatic gland involvement even in the axilla and that whenever there is distinct lymphatic gland involvement in the axilla there is also probably lymphatic gland involvement in the anterior mediastinum making the case where this involvement exists almost hopeless from the standpoint of radical cure Now let us ask ourselves in regard to the prognosis from the standpoint of permanent cure On this point there has been great diversity of opinion For a time there was a great effort made shortly after the introduction of the very extensive operation for the radical cure of breast cancer to make it appear that these extensive operations had entirely revolutionized this work and that these operations were capable of giving a very high rate of permanent cures some clinics reporting even as high as 40 or 50 per cent A careful analysis of these statistics shows that they do not represent the real facts The statistics reported from one of our best surgical clinics were based on a proposition which for a long time was not understood although it was clear enough,

and which, not being clearly understood, led to a general misconception of the findings. The plan in this clinic was to divide the cases into two groups: group one included the cases which, after the operation was completed gave, in the opinion of the surgeon, a prospect of permanent cure. The second group included those cases which, after the operation was completed, did not, in the opinion of the surgeon, give a prospect of complete cure, and this second group was not included in the final statistics. This handling of the cases naturally gave a very high percentage of cures after three years, much higher than the percentage obtained in the clinics where all the cases operated on were included in making up the final result. Then again, in some of the earlier work there can be no doubt that a good many cases of benign tumor were treated by the radical operation and reported, mistakenly, of course, as cancer cases. Considering all the evidence at hand, I think one may say that probably about 20 per cent. of the carcinoma cases that come to our active service show at the end of three or even five years no recurrence, and that this fairly represents the results that can be obtained by means of efficient modern surgery as applied to all the cases that present themselves. There can be no doubt whatever but that the propaganda that is being carried on now by a number of agencies, notably by the Society for the Control of Cancer, is educating the public so that these cases are coming to us earlier than formerly, and that with the earlier operations we shall be able to increase very materially the number of cases cured by radical operation. The basic principles involved in the surgical treatment of mammary carcinoma are now so well understood that there should be but very little difference in the results obtained in the different clinics. The one thing that we must strive to obtain is early recognition of the cases and early operative interference.

I am very much impressed with the fact that there is being done a lot of very bad medical management and bad surgery in connection with breast tumors and supposed breast tumors. There are two distinct phases of this subject that I should like to discuss with you briefly. First, the failure to recognize car-

cinoma of the breast by the *general practitioner*, and hence the failure to urge immediate radical operation, and second, unnecessary radical operations done on breasts for benign tumors and for imaginary tumors. In regard to the first subject, as a consulting surgeon I see almost every week patients who have advanced carcinoma of the breast that have been treated by their family physician as caked breast or chronic mastitis, or under some other diagnosis, where an expert would have recognized the fact that carcinoma existed and would have given the patient the benefit of an early operation. This mistake is so common that I like to take every opportunity possible to point it out. To one who has had a wide experience in diagnosing these cases the diagnosis seems so perfectly clear in 90 per cent or more of the cases, even where the carcinoma is not larger than a bean, that it is difficult to understand how mistakes are so frequently made today. The gross examination of carcinoma of the breast gives one exactly the same impression that you obtain from examining a slide under the microscope, that is, that the carcinoma infiltrates the surrounding tissues, is embedded in the surrounding tissues and that it has a tendency to draw toward the center of the lesions the strands of connective tissue that radiate out from it so that if it is close to the skin there is a tendency to dimpling of the skin. These characteristics are so definite and are so different from benign tumors and inflammatory lesions that we have no hesitancy in making in more than 90 per cent of the cases the immediate diagnosis from the clinical findings. In the small minority of less than 10 per cent where there is a question about the clinical diagnosis the position should be taken that the case should be immediately investigated the patient gotten ready for the radical operation, and then before removing the breast the tumor cut into and the diagnosis made either from the gross section or, if there is the slightest doubt as to its character from a frozen section made at that time, so that the radical operation can be done under that anesthetic.

The other phase, that of unnecessary radical operations for benign tumors and for imaginary tumors, is a very interesting subject and one which I have studied with a good deal of care for

a number of years. I certainly see more than 50 women a year who come to me with the fear that they have cancer, or with the statement that Doctor So and So has made a diagnosis of breast cancer and has recommended a radical operation, where, on the most careful examination, no neoplasm can be found. These are for the most part women who have rather lobulated breasts, the different portions of the mammary gland being separated by pretty definite septa of connective tissue, and where for some reason they have occasional pains in the breast, and because of the pain and this lobulated condition the physician makes a diagnosis of a tumor. Then again there are women who have what might be called "cancerphobia." Their sister or mother or husband or some member of the family has had cancer, and because of some twinge in the breast they have worried themselves into believing that they have a cancer developing.

Of course, I find not infrequently cases of clinically benign tumors which have been diagnosed as carcinoma, and the recommendation of a radical operation has been made. There was a time in the development of surgery of the breast when surgeons had altogether a wrong conception of the facts as to the frequency of benign and malignant tumors. The statistics of Gross and Billroth give about the same results, approximately 80 per cent. of carcinoma, 10 per cent. of sarcoma, and 10 per cent. of benign tumors of the breast. The results from my own surgical clinic and my own surgical laboratory have shown within the last few years that the majority of the cases that now come to us with breast tumors are benign. I think as a working basis we might say here that about half of the women coming to us with tumors of the breast have cancer and about half have benign tumors.

Now what are we to do with the benign tumors? I think we should accept the proposition that, as a rule, they should be removed. There are some exceptions to this, because not infrequently I find young women coming to me with small multiple fibroids in both breasts where the multiple involvement of both breasts, the age and character of the tumors, make it absolutely certain that they are benign, and one might very properly in such cases hesitate about disfiguring the breasts by multiple

incisions where the benign character of the growth was so clearly established. On the whole however, especially where they are single, it is a good rule to follow to remove the tumor and to submit it to microscopic examination and certainly not to remove the breast unless the evidence of malignancy demands it. These benign tumors are so readily diagnosed by the surgeon of experience that comparatively few mistakes are made in the clinical diagnosis. The movability of the tumor in the mammary gland tissue and the lack of the characteristic infiltration of a carcinoma make the differential diagnosis in the vast majority of cases clear and easy.

In regard to the principle that has been preached pretty generally that these benign tumors should be removed because they may become malignant I desire to enter a strong protest. The experience in my clinic has shown that out of several hundred benign tumors which we have removed by local operation, but a single case as far as we know has been followed by a carcinoma of the breast later and this was in a case which grossly was a simple cyst of the breast and which under the microscope failed to show any malignant characteristics. A year later a carcinoma developed in that breast and the woman died of general carcinomatosis in spite of a radical operation. There are in this case two possibilities one that the case was from the start a carcinoma and that we failed to recognize it, and the other possibility is that a carcinoma developed in this mammary gland which the year before had a simple cyst which was removed by operation. It certainly would not be surprising if out of several hundred women who had benign tumors of the breast there should be a certain small proportion in whom a carcinoma developed later, but certainly it is exceptionally rare, so rare that there is no fair argument to advise radical operation because of the risk of the development of this benign tumor into a cancer.

CLINIC OF DR. ALBERT J. OCHSNER

AUGUSTANA HOSPITAL

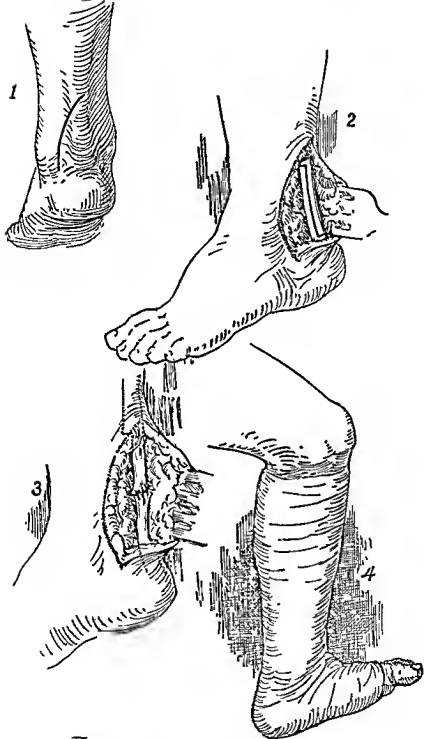
TALIPES EQUINOVARUS FOLLOWING ACUTE ANTERIOR POLIOMYELITIS: TREATMENT BY LENGTHENING THE TENDO ACHILLIS AND OVERCORRECTION IN A PLASTER CAST

THE patient, a boy of four and one-half years, was admitted to the hospital October 1, 1916, because of talipes equinovarus of the left foot.

His family history is negative. He was born at term, normal delivery. He had scarlet fever shortly after birth. When one year old, while teething, he was ill for about a month, during which time he was feverish. He had walked a little at the age of eleven months, but after the illness was not able to walk until he was about two years of age, and then he walked very poorly. He drags the left leg and throws the foot out when walking. He has grown well and is strong, but the walking seems to be getting worse. For about one year he kept the left arm flexed, but now it is practically normal.

PHYSICAL EXAMINATION

He is a well-developed and well-nourished child with a good color. Both tonsils are markedly hypertrophied. The neck, chest, heart, lungs, and abdomen are negative. Both arms are equal and strong and the right leg is normal. When he walks he keeps the left foot forward and swings it out somewhat. When he stands, it is on the ball of the left foot. The foot is kept flexed and the tendo achillis is very tense. The calf of the left leg is about two-thirds the size of the right, there being a difference of 3 cm. in circumference. There is paralysis of the peroneal muscles of the left leg and contraction of all the flexor muscles.



COMMENTS AND OPERATION

DR. OCHSNER (October 2, 1916): This patient had an attack of infantile paralysis with only a partial paralysis of the anterior muscles of the leg. In our experience the peroneal muscles have been involved in a larger percentage of cases and to a greater extent than the tibialis anticus. For that reason in these infantile paralysis cases we have more frequently talipes equinovarus than talipes equinus. Usually, therefore, the peroneal muscles have become weakened, while with time the tibialis anticus has gained slightly in strength and the gastrocnemius and soleus muscles have gained greatly in strength. In this case, however, the paralysis of the anterior muscles is uniform, while the gastrocnemius and soleus muscles have been splendidly developed and the peronei have not suffered at all. On the contrary, the relaxation of the anterior muscles has served to permit a contraction of the gastrocnemius and soleus muscles. In order to prevent an atrophy of the anterior muscles the patient's leg has been treated constantly by means of massage since the acute condition subsided. The ankle-joint is so arranged that the astragalus acts as a fulcrum against the lower surface of the tibia, and the contraction of the gastrocnemius and soleus muscles causes the foot to form an obtuse angle with the leg. Also a plane drawn backward on a parallel with the sole of the foot would form an acute angle with the leg. Mechanically, then, the gastrocnemius and soleus muscles predominate over the anterior muscles. In order to eliminate this we must secure a position for the foot which makes the angle between that and the leg an acute angle. In order to do this we expose the tendo achillis by means of a curved lateral incision, as indicated in Fig. 329, 1. The skin is carefully retracted by means of small retractors and the tendo achillis is then split longitudinally for a distance of 4 cm. (Fig. 329, 2) and cut off at the lower end by turning the scalpel outward, and at the upper end by turning the scalpel inward. The

Fig. 329.—Dr. Ochsner's case of contracture of tendo achillis: 1, Incision. 2, Method of making longitudinal incision so as to lengthen the tendon. 3, The two cut ends sutured together. 4, Plaster-of-Paris cast applied in greatly over-corrected position.

foot is then flexed against the leg and the two free ends of the cut tendo achillis are opposed (Fig 329 3) Four fine chromicized catgut sutures are utilized to suture the ends of the tendo achillis together and then the wound is carefully closed The foot is dressed in an overcorrected position so that the angle between the foot and the leg is less than a right angle (Fig 329 4) Then a plaster-of Paris cast is applied and a window left for dressing The cast is left in place for a period of three months At the end of that time it is removed during the daytime and reapplied at night The use of massage is instituted as soon as the cast is removed

The history also states that the child has fully recovered from the slight paralysis of the left arm which he had after the recovery from the acute symptoms of his infantile paralysis or anterior poliomyelitis This would indicate that we can hope for further improvement of the muscles of the leg to quite a marked extent so that the ultimate result will probably be very satisfactory

VARICOSE VEINS OF THE LEG

Summary: Six cases. Treatment by a combination of the Unna paste boot with operation by excision, by the Mayo vein stripper, and the Schede operation; the Nussbaum incision and Thiersch grafts for ulcer.

CASE I

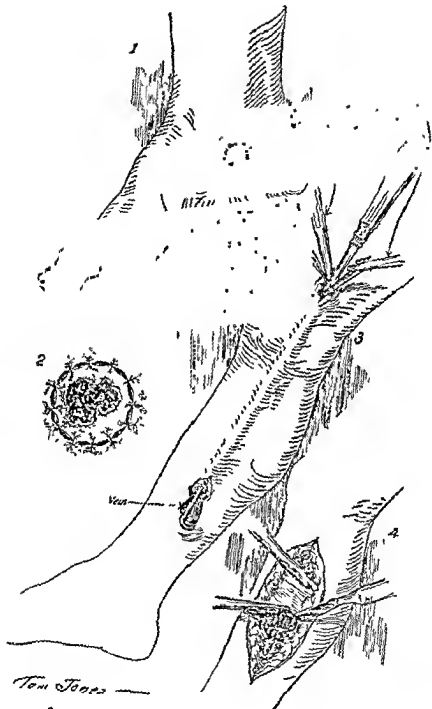
History.—The patient, a married woman of fifty-eight years, was admitted to the hospital September 29, 1916, because of a cystic colloid adenoma of the thyroid and varicose veins of both legs.

Her family history is negative. Her past history is negative. She has had 8 children, 4 of whom are living. She passed through the menopause at the age of forty-eight years.

She has had large veins and recurrent ulcers of both legs since ten years ago. For the past two months there has been a large open sore on the right ankle, which has progressively become larger. There is much itching. She has had a goiter since she came to America twenty-six years ago, and it has grown slowly ever since. She has no symptoms attributable to the goiter. There is no abdominal or pelvic trouble.

Physical Examination.—The patient is a well-developed and moderately obese elderly woman with a good color. The upper teeth are missing and there is a moderate pyorrhea of the lower jaw. There is a large single tumor in the region of the isthmus of the thyroid gland, which is nearly spheric and about 8 cm. in diameter. It fluctuates and is very tense. There is no bruit and no other signs of hyperthyroidism. The heart, lungs, breasts, and abdomen are negative. There are large varicose veins in both lower legs with numerous scars of former ulcers and hemorrhages. On the inner aspect of the right ankle is a large indurated varicose ulcer 5 cm. in diameter.

Comments and Operation.—DR. OCHSNER (October 9, 1916): This patient had a large goiter removed last Wednesday. I would not take out the varicose veins then because I was afraid



it might be too much for her, so I left the veins in place. Now we will remove them.

The patient has been anesthetized and the assistant is holding the entire right leg at right angles with the plane of the table in order to drain the blood out of the veins. A towel is now wrapped around the upper thigh and this heavy rubber tubing wrapped tightly about the leg over the towel. This serves the purpose of an Esmarch constrictor and effectively shuts off the circulation of the leg, both arterial and venous. It will not be removed until the operation is completed and dressings applied.

Now for this ulcer below we will make a Nussbaum operation. She has an ulcer on the inner side of the right foot, and in order to control the venous supply I shall make this incision about 2 cm. away from the margin of the ulcer (Fig. 330, 1). The object of this is to control all of the superficial veins so as to prevent venous stasis in the future. The difficulty in these cases lies in the fact that these superficial veins have had their valves destroyed. We grasp these veins by means of hemostatic forceps and ligate them with fine catgut which maintains the field perfectly dry. In the second place, we do not wish this patient to lose any blood because she has been weakened considerably by her goiter operation. The local condition, however, is so uncomfortable that we have decided to remove these veins while she is in the hospital. I am extremely careful in this portion of the Nussbaum operation not to make traction upon the skin-flap which is mobilized by this circular incision about the ulcer, because I wish to preserve it in as nearly a perfect condition as possible. This first circular incision is now closed with interrupted sutures of horsehair (Fig. 330, 2).

We now make an incision directly over the long saphenous vein at a point 6 cm. above the knee-joint. There we have exposed the vein, and we now bring it out between two pairs of

Fig. 330—Case I. Showing the method of treating a case of varicose veins of the leg complicated by a varicose ulcer: 1, Nussbaum operation, showing incision around the ulcer. 2, Details of suture of the same incision. 3, Method of using the Mayo vein stripper for the long saphenous vein. 4, Excision of a mass of varicose veins *en bloc*.

hemostatic forceps cut it, and thread this distal end through the eye of the instrument which Dr Charles Mayo invented for the management of these cases—the Mayo vein stripper. By this means we are enabled to dissect out this vein without the necessity of carrying our incision down its entire length (Fig 330 3). We carefully push the instrument along and find that we can dissect out the vein down past the middle of the leg. This seems to account for most of the varicosities on the medial aspect of the limb.

On the anterior surface of the leg I find that the veins have so many branches and are so irregular in their structure that it is necessary to lay open the skin for a distance of about 20 cm in order to remove the most troublesome of the veins (Fig 330 4). In order to prevent an accumulation of fluid underneath these flaps I am making several small buttonhole incisions extending through the skin which will prevent serum from accumulating and will let it pass out into the dressings. We ligate all the veins that we have severed. The blood from these skin areas will be carried back to the heart through the deep veins the superficial veins having been excised. It is the backing up of the blood in the superficial veins which has caused the formation of the ulcer which will now undoubtedly heal within a week. In order to make sure that all the superficial veins have been severed I add to the operation which I have completed so far a spiral incision partly encircling the leg. I am careful to leave between the spirals a strip of skin at least 3 cm in width in order to prevent troublesome cicatricial contraction later on. As I come upon the veins they are grasped between two forceps and ligated. Ordinarily we do not fear for the smaller veins but in this case as I said before I am trying to provide against the loss of even the smallest amount of blood. Consequently I take this precaution. This operation is known as the Schede operation because it was introduced some twenty five years ago by Professor Max Schede of Hamburg later Professor of Surgery in the University of Bonn. Anteriorly you see I have left a bridge of skin 3 cm long and am leaving a smaller strip posteriorly. In this way I guard against cicatricial contraction,

which might interfere with the comfort of the patient. All the superficial veins of the entire leg have now been severed. All the incisions will be sutured carefully and a snug bandage applied. The legs will be placed in an elevated position at an angle of about 45 degrees, so that the return circulation will be aided constantly by gravity until the wounds have healed.

After the wounds have healed, in about two weeks, we will apply to the extremity an Unna paste cast. This is made by painting upon the surface of the extremity a mixture known as Unna's paste, made as follows: 10 parts of distilled water is beaten over a water-bath in which is dissolved 4 parts of best grade of sheet gelatin. When this gelatin has dissolved, we add 10 parts of glycerin, and while the mixture is still hot, 4 parts of zinc oxid. Fine gauze bandages 5 cm. in width are used for the construction of this cast. The surface of the skin is covered by means of a brush with the paste which has been heated over the ordinary water-bath, then a layer of bandage is applied, then more of the paste, and then more bandage, and this is continued until we have four or five layers of gauze and paint. Finally the entire surface is covered with a narrow bandage about 3 cm. in width. The cast remains soft but firm, and is much more satisfactory than an elastic bandage. Such a dressing can be left on for from six to fourteen weeks, depending on weather conditions. During hot weather the paste tends to become somewhat soft and the bandages loosen sooner than when the temperature is lower.

CASE II

I shall now show several cases of varicose veins and varicose ulcers that have been treated and are still in the hospital. The next case is one which has almost precisely the same condition as the previous one. She is a married woman, a Russian, thirty years of age, with negative past and family histories. She has had 6 children all of whom are living.

Present Complaint.—After the birth of her first child twelve years ago she began to develop irregular swellings on the inside of the left leg. These did not bother her until about three years ago, when they began to itch and she scratched them. A sore

developed which bled at times. She consulted a physician, who treated her at a hospital with different lotions for a period of five weeks. Since then she has been at home under medical care, but the leg has steadily become worse. She stayed in bed most of

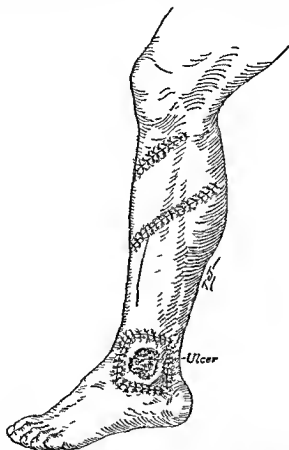


Fig. 331.—Case II. A case that has been treated by a combined Nussbaum Schede-Mayo operation. External aspect of leg showing incision about the ulcer (Nussbaum) and two oblique Schede incisions.

the time. About a week ago the left leg became very much worse and she had a generalized swelling of the entire leg up to the middle of the thigh.

Physical Examination.—Negative, except with regard to the

left leg. Here there was a large, edematous swelling with irregular tortuous veins showing beneath the skin, especially over

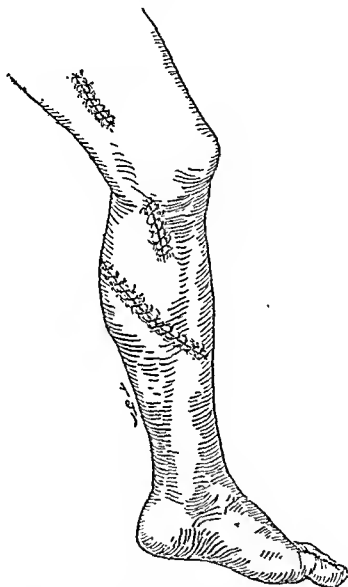


Fig. 332.—Case II. A case that has been treated by a combined Nussbaum-Schede-Mayo operation. Internal aspect showing a third Schede incision and the small wounds through which the saphenous vein has been removed.

the inner aspect, and extending from the dorsum of the foot to the upper end of the saphenous vein. There were several brownish blotches over some of these nodular areas, indicative

of former ulcerations and hemorrhages. On the external surface of the ankle was an irregular, round ulcer 3 cm. in diameter, with ragged, somewhat rolled edges and a dull gray base, upon which was a seropurulent discharge.

Comments—**DR. OCHSNER** This case has been treated in practically the same manner as the case you just saw, except that a square incision was made about the ulcer instead of the round Nussbaum operation (Fig. 331). You will also note that the corners of the incision do not meet, but that there is a bridge of skin 5mm. long at each corner. The object of this is to prevent cicatricial contraction of the scar *in toto*. You will also note the two small incisions, one above and one below the knee (Fig. 332), where the long saphenous vein was removed with the Mayo vein dissector. Two lateral and one medial Schede incisions are also evident. This case was operated upon two weeks ago and the dressings have not been removed until today, when she is brought up to have the stitches removed. You will note the ulcer has a much more healthy appearance with granulations at the bottom and that all the incisions are well healed. One week from today an Unna paste cast will be applied in the manner already described.

CASE III

This case is a woman forty seven years of age, married, in whose family there is a distinct history of tuberculosis. She had pneumonia thirty years ago. In 1901 a tumor mass was removed from the right jaw.

She has always done her own work and has been forced to be on her feet for many hours each day. She thinks that her three pregnancies had nothing to do with the varicose veins now present. She states that her mother had varicose veins of both legs. Four years ago she first noticed a blue line beneath the skin on the internal surface of the left leg running from the ankle to the knee. At that time the leg became swollen and ached a great deal. One year previous to admission to the hospital the patient struck her leg against an iron bed and rubbed off the skin over a small area above the internal malleolus of the left



Fig. 333.—Case III. The skin-grafts applied.

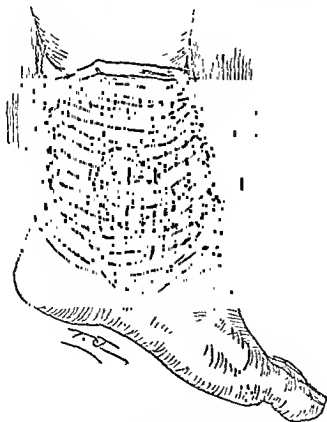


Fig. 334.—Case III. A wire screen applied to protect the grafts.

leg. This abraded area did not heal and a varicose ulcer developed, which has been present ever since.

Comments.—DR. OCHSNER: In this case the veins were not enlarged to a sufficient extent, nor were many of the valves de-

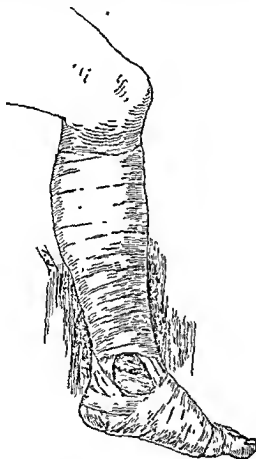


Fig. 335 —Case III. Unna's paste cast involving the lower leg, but excluding the ulcer.

stroyed. She was treated by elevating the leg upon pillows at an angle of 45 degrees and applying moist, warm boric acid dressings for a period of two weeks, after which she presented a clean ulcer with a full protection of healthy granulation tissue. Ten

days ago we applied Thiersch skin-grafts to the ulcer (Fig. 333) and then placed a basket made of wire netting in order to protect the grafts and ulcer from the dressings (Fig. 334). The grafts were allowed to heal while exposed to the air. These grafts healed very rapidly, and yesterday we applied an Unna paste cast (Fig. 335), involving all the leg from the toes to a point 2 cm. below the knee, except that part which had been covered with the skin-grafts. The reason we allowed the skin-grafts to be left uncovered was that this new-formed skin is very tender and cannot withstand the maceration incident to inclusion in a cast. Now she is ready to go home and there is no danger of the ulcer recurring because of the fact that the varicose veins are being well supported by the Unna paste dressing.

CASE IV

This patient, a Russian male aged forty-six, by occupation a storekeeper, is in for his second Unna's paste cast. His history is as follows:

For five years he had had enlarged veins on the left leg, which caused him little annoyance until about two years ago, when they began to swell and pain, especially toward the end of the day's work. On the advice of a physician he wore a tight bandage for a year, which then caused the upper leg to swell. About a year ago he removed the bandage and since that time he has had cramps in the leg, which have been so severe at times as to cause him to go to bed for several days. He would never have any pain at night if he elevated the leg upon pillows.

He was admitted to the hospital in the morning and the leg was immediately elevated and kept elevated throughout that day and night. The next morning an Unna paste cast was applied in the usual manner. Six hours later he was allowed to leave the hospital. This morning, eight weeks after the application of the first cast, a second cast will be applied after removing the old one and cleansing the leg thoroughly. He has experienced no pain, cramps, or swelling during the past two months, and it is our opinion that this second cast will be the last one he will need.

The length of time that these casts remain in place depends

largely on the weather conditions. In winter or during cool weather a cast will remain in good condition from six to fourteen weeks. Excessive heat however causes the gelatin in the mixture to soften thereby allowing the bandages to loosen. In such cases the dressings must be applied at more frequent intervals.

CASE V

A woman aged fifty one who had what was termed typhoid malaria at the age of thirty years. She has borne 2 children who are now thirty and twenty six years of age respectively. Menopause occurred one year ago. When the patient was a young girl her right knee cap would occasionally slip out of place to one side and she would fall and have a great deal of pain. Ever since that time she has worn a knee handage in order to hold the knee cap in place. About ten years ago she began to be troubled with a swelling of the legs just above the ankles. On the advice of her physician she wore rubber stockings and has continued the use of these up to the present time. About three years ago the patient was troubled with hard red painful areas which would appear on the legs and last from two to three weeks but without ulceration of the skin. The swelling and tight feeling has become worse since then. During the past year she has been almost unable to move her limbs in the morning upon arising. The pains at times extend from the toes to above the knees. She never has seen any veins. She has been severely constipated for the past three years.

Diagnosis —Edema of the legs due to impaired venous circulation following the use of a constricting handage about the knee.

Treatment —Unna's paste cast to both legs.

CASE VI

A woman aged forty one a housewife who had a hysterectomy performed two years ago. During the past twenty years she has been troubled occasionally with swelling of the veins of the left leg accompanied by pain. This swelling was always worse when she was pregnant. Six weeks ago the present attack began as a

painful clump of enlarged veins about 5 inches below left knee. She states that she was hit at this place by a brick twenty-five years ago and that the spot has always been more or less tender. This area has pained her constantly for the past six weeks and the pain is increasing, especially on standing. She has noticed a swelling of both legs for the past few months, which is worse in hot weather. She becomes dyspneic on slight exertion, such as climbing stairs, but has no palpitation and no cough.

Treatment.—An anterior incision was made in the upper middle third of the left leg in an oblique direction, and the varicose veins, which had perforated, excised. The internal saphenous vein was stripped to a point half-way between the knee and the hip with a Mayo vein dissector and the proximal end ligated. Several smaller branches were followed to the ankle, cut, and ligated. Two Schede incisions over the calf of the leg were made and a number of small veins again cut and ligated.

This case remained in the hospital two weeks. The stitches were removed at that time. Four days later an Unna paste cast was applied and the patient went home on the following day.



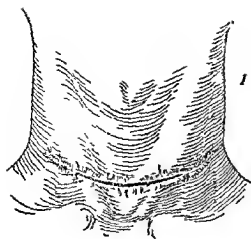
POSTOPERATIVE TETANY OF STERNOCLEIDOMASTOID MUSCLE: TREATMENT BY TENOTOMY AND CALCIUM LACTATE INTERNALLY

Summary: Tetany of sternocleidomastoid following second operation on thyroid gland for hyperthyroidism; technic of tenotomy; medicinal treatment—calcium lactate and parathyroid tablets; other methods of treating parathyroid tetany—thyroid grafts—excision of cervical ganglia.

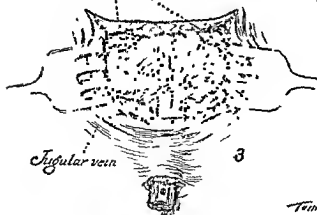
COMMENTS AND OPERATION

DR. OCHSNER (September 20, 1916): This patient suffered from hyperthyroidism, and for this condition a portion of the thyroid gland was removed. You can hardly see the line here. (Indicating the Kocher collar incision.) After this was removed he improved very much and remained very much better for a number of months. Then he came back with more hyperthyroidism and another portion of the gland was removed. Now he comes back with a certain degree of tetany, and the manner in which this condition troubles him most is in the contraction of the sternocleidomastoid muscle, particularly the sternal end of this muscle. Now after he is asleep you can see that this muscle is in a spasmodic condition. You can see these portions of the muscle standing out, and so, in order to relieve this condition, I am going to sever the sternal attachment of the sternocleidomastoid muscle. I am making an incision through the line of the former incision (Fig. 336, 1) and I am reflecting the skin downward so as to expose this lower attachment of the sternocleidomastoid muscle. Now I sever the attachment below so that there is nothing left against which this part of the sternocleidomastoid muscle can pull (Fig. 336, 2). The operation is the exact operation that Mr. Robert Jones of Liverpool uses in relieving torticollis, which is due to an actual shortening of the sternocleidomastoid.

I am exceedingly careful to control the hemorrhage as I proceed step by step, because I wish to keep the field entirely



*Severed sternal attachments
of sternorastoid mus retracted
about 3 cm*



Tim Jones

free, so that I can see clearly what I am doing. You see the muscle contracts immediately a distance of 3 cm., which I think will be quite sufficient to give him permanent relief (Fig. 336, 3). Just on the inside of the edge of this muscle you see this bulging, which is due to the dilatation of the deep jugular vein, which is located posterior to the sternocleidomastoid muscle, and now that the muscle has contracted the vessel bulges.

The anesthesia is the one we use when we operate for removal of the thyroid gland. The patient received $\frac{1}{4}$ grain of morphin and $\frac{1}{16}$ grain of atropin one-half hour before the anesthetic was begun, and now with the head elevated we have the patient fully under the control of the anesthetic throughout the operation.

We will make a little opening at the site of the original drainage opening and a little glass Kocher drainage-tube will be put into this space so as to prevent an accumulation of blood. Then we control the hemorrhage perfectly by ligating the vessels of the skin-flaps and close the wound in the skin by horsehair sutures.

The patient will be given 15 grains of calcium lactate an hour before and after each meal and at bedtime, so that he will have during twenty-four hours a little over 100 grains of calcium lactate. I believe that will be sufficient to relieve the spasm of the muscles, and the absence of the spasm will overcome his nervous condition. It was the fact that these muscles would suddenly become tense and would make him so nervous that he felt that his old trouble was coming back. We will also give this patient some parathyroid tablets— $\frac{1}{4}$ grain four times a day. I have had a number of cases in which the calcium lactate seemed to have a specific effect in overcoming the contraction of the muscle, so that in these cases the tetany disappeared entirely, except in one case, in which we had to remove the cervical ganglion from which branches supply the sternocleidomastoid and the scalenus muscles. In the other case the tetany seemed to be

Fig. 336—1, Incision made through scar from the two previous operations. 2, Sternal attachments of the sternocleidomastoid muscle being severed. 3, Retracted ends of the muscle and a glass tube drain in position just before closure of the wound.

the result of an injury to the lower parathyroid. In each case there was a secondary operation, that is, a primary operation for the removal of a portion of the gland and a secondary operation for the same purpose, but which in addition had interfered with the parathyroid, either by direct injury or by cicatricial contraction. This patient has had two operations. He has had portions of the thyroid gland removed twice. Now two years later he comes with this slight form of tetany. In one case in which there was tetany it had resulted from an infection. She had a severe infection from her tonsils, and this infection apparently extended to the parathyroid gland, and she had quite a marked tetany. In this case we grafted one lobe of the thyroid gland which we removed from another patient, into the neck. That grew nicely at first and the patient was relieved of the tetany for a year. Then that seemed to absorb and the tetany recurred. We removed the cervical ganglion two years ago, which seems to have kept the tetany from returning until the present time. Whether it will recur or not, of course, we cannot tell.

CLINIC OF DR. JOHN RIDLON

MERCY HOSPITAL

HIP DISEASE

Summary Fourteen cases illustrating the salient clinical features of hip disease and some of the difficulties in the differentiation of tuberculosis of the hip from other pathologic conditions.

May 21, 1917.

I AM able to show you today only 2 patients with three diseased hips. Fortunately, they are borderland cases and warrant a discussion of the subject of hip disease from many sides.

At one time the term "hip disease" was used to cover about all diseased conditions at the hip-joint. Then osteomyelitis was differentiated; then osteoarthritis, and finally osteochondritis—Perthes' disease—from tuberculosis of the joint, as hip disease had come to be accepted pathologically. Now the diagnostic pendulum seems to be swinging back from that which is pathologically often uncertain to that which is clinically certain, namely, that the hip is diseased—hip disease.

Here are two brothers, the only children of healthy parents. The older was nine years of age when he came to me January 17, 1916. He had been walking lame for about two months. Little complaint of pain and no night cries. He had always been a healthy child except for an abscess under the left ear which discharged from his second to his sixth year, and left a deep scar. He was, when first seen by me, as he is now, a healthy looking boy.

Examination showed the left leg $\frac{1}{4}$ inch shorter and $\frac{1}{4}$ inch smaller as to calf and thigh than the other. The limb was held somewhat adducted; abduction and rotation were restricted; flexion was almost normal; hyperextension was restricted.

The radiogram of the two hips showed the left femoral head somewhat smaller than the right, with, possibly, a detached piece on its articular surface $\frac{1}{2}$ to $\frac{3}{4}$ inch long (Fig. 337).

The diagnosis of osteochondritis was made and a short plaster spica put on. He was allowed to walk on the leg in moderation and without crutches. This treatment was continued up to January 29 1917, when the cast was removed. Now after about four months you see that he walks and runs with scarcely any limping and no evidence of pain or sensitiveness and that he has about half the normal range of motion at the hip joint in all directions. But the radiogram today shows that a very



Fig. 337—Case I

serious amount of destruction has taken place in the head of the femur (Fig. 338)

The younger brother aged seven years was brought to me on January 29 1917. He was the first to go lame namely some eight months earlier. He was treated first by the general practitioner who had charge of the case with an 'ambulatory splint' for about nine months. Then an anesthetic was administered and a plaster cast put on with the thigh (left) flexed about 45 degrees and the knee flexed on the thigh to about the same

extent. When I first examined the patient there was practically no motion in any direction at the hip-joint, and measurements as to the length of the limbs was unsatisfactory because of the flexion deformity. The radiogram of the two hips shows little difference (Fig. 339). By prolonged gentle manual traction the limb was straightened about one-half and a short plaster spica applied.



Fig. 338—Case I.

By the end of two months the flexion deformity had been corrected, and there was some motion in flexion on gentle manipulation. From this on the range of motion steadily increased. At the end of six months he came walking on the toe of the right foot with the thigh held flexed and adducted. Motion in abduction and hyperextension was not possible, and rotation was greatly restricted.

From this on the boy was treated by a double plaster spica,

and of course was unable to walk without crutches After eight months the cast was removed from the left (first) hip but has been continued on the right (second) hip He has as you see about as good a range of motion in the left hip as his older brother

Are these cases of Perthes disease—osteochondritis—or are they mild hip disease (whatever that may mean) or are they tubercular or what? Frankly I do not know Let us call them cases of hip disease



Fig 339—Case II

In any event the treatment should be the same To prevent the development of deformity to correct any deformity that may have developed to protect the joints as long as they are sensitive and to allow use in walking long before the immobilizing plaster cast or splint is discarded

It may be of interest to compare this second case the boy with disease at both hips with another double hip disease case one frankly tuberculous

CASE III—On July 31 1909 a boy three and a half years

old, of healthy parents, was brought to me for disease of the right hip. About six months earlier he complained of pain in his thigh, which passed away after about a week. A month to six weeks later it returned and has remained more or less constant. For six weeks he has cried out in his sleep. Has limped for about four months. There was noticeable muscular spasm, and slight restriction to motion in all directions at the hip-joint. The thigh was $\frac{3}{8}$ inch smaller than the left, but the calves measured the same, and there was no shortening.

Treatment was by the long (Ridlon) traction splint (Fig. 340). After three months swelling was noted in the groin as from an abscess. After some months this swelling disappeared.

Two years later he began to complain occasionally of pain in the other hip, but nothing was found on examination. After about nine months the pain became persistent and there were night cries. Muscular spasm and limitation of motion in all directions were present. The traction splint was discarded and a double Thomas hip-splint applied, and walking forbidden. This was in April, 1912. By the end of December, 1913, the boy was getting beyond control and crawled about and stood by himself. One day while being taken from his carriage he complained of the left knee, and it soon became swollen. Knee-joint disease was suspected, but a radiogram showed a fracture $2\frac{1}{2}$ inches above the knee-joint.

A radiogram of the hip-joints at that time showed the right hip apparently well, but the left hip doubtful. Treatment of the right hip was discontinued; the left hip and the fractured femur were put up in a plaster splint from the toes to the nipples.

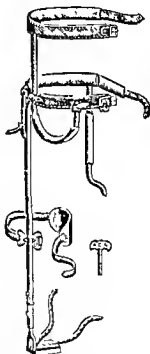


Fig. 340—The Ridlon long traction hip-splint

After two months he was allowed to walk. After three and a half months the fracture was found solidly united. Treatment of the left hip was continued with a plaster spica for another year up to March 1915 nearly six years from the beginning of treatment of the first hip. At some time during the period of treatment in the double Thomas hip splint the record does not state just when a cold abscess developed on the left thigh opened spontaneously and after discharging for several months closed.

The final result is that the right (first) hip which had only a little motion when treatment of it was discontinued now has practically normal motion and in the radiogram shows small evidence of having been diseased while the left hip has only about one third normal motion and despite the abscess shows less destruction of bone than is shown in the hip of Case I that had no pain no night cries and no abscess. It has been now two years since treatment was discontinued.

Quite a different result is shown in Case IV. A boy seven years old of healthy parentage was brought to me June 14 1906. He had dragged his right leg for two years. The attack came suddenly at night the boy crying out and holding his knee drawn up.

Examination showed the boy walking with a limp. Legs same length calf $\frac{1}{8}$ inch and thigh $\frac{3}{8}$ inch smaller. Motion in flexion and inward rotation restricted but other motions nearly normal. A month later the limb was held adducted and rotated inward and motion in all directions was greatly restricted.

For five years he was treated with the long traction splint. He never had pain or sensitiveness but adduction deformity with false shortening steadily developed. Then the limb was stretched during anesthesia and put in a plaster spica for six or eight months. Treatment was discontinued six years after starting.

A year and a half later at the end of 1913 he still appeared to be well with a practical and a real shortening of $1\frac{3}{4}$ inches. Two years later the real shortening had become $2\frac{1}{2}$

inches and the practical shortening $3\frac{1}{2}$ inches. Since then he has developed pulmonary tuberculosis.

The radiogram of the hip shows an enormously eroded and enlarged acetabulum with the femoral head gone, or at least eroded to the size of the femoral neck (Fig. 341). This boy has practically no motion at the hip-joint, while other cases appearing identical in the radiogram may have practically normal motion.



Fig. 341—Case IV.

CASE V.—Note the radiogram (Fig. 342). Apparently a complete ankylosis. The patient was a girl of thirteen years, who had had pain and some limping off and on for two years. the affected leg was $\frac{1}{2}$ inch short; the thigh 1 inch and the calf $\frac{1}{4}$ inch smaller. About half the normal range of motion was present in all directions. Treatment was by a plaster spica for two years. Two years after treatment had been discontinued the limb was no shorter ($\frac{1}{2}$ inch) than at the beginning, and the range of motion was fully one-third the normal in all directions. It was at that time that this radiogram was made.

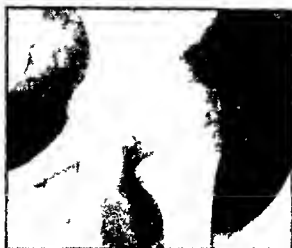


Fig 342—Case V

CASE VI—The radiogram of this case shows the typical result after recovery from Perthes' disease, but when I treated



Fig 343—Case VI Healed osteochondritis note flattening of femoral head on affected side

him from 1911 to 1913 I believed the case to be one of tuberculosis of the hip following an injury sustained eight months before (Fig 343)

CASE VII.—A boy eleven years old fell and hurt his hip. He limped and complained. I examined him after two weeks in bed and found no definite cause for his symptoms. He was kept in bed about two months. Eight months after the first attack he developed typical pain, limp, and restriction to motion in all directions. The calf was $\frac{1}{4}$ inch and the thigh $\frac{5}{8}$ inch smaller, but there was no shortening.

The radiogram "suggested disease of the acetabulum." He was treated for eighteen months with the long traction hip-



Fig. 344—Case VII.

splint. He recovered with a perfect range of motion, and the radiogram shows an apparently normal hip (Fig. 344). The case, when treatment was commenced, was more typically one of tuberculosis than any of those previously referred to.

CASE VIII illustrates another type of result which is found in hip disease. The boy was three years old when first seen. He walked with a limp and motion in all directions was restricted to some extent, and there was beginning hip disease. He was treated with a long traction splint for four years, at which time the disease appeared to be well, but the limb was

left with both true and false shortening somewhat flexed and markedly adducted and with little motion. An anesthetic was then given the leg stretched and abducted and put in a plaster spica which was removed from time to time and worn for a year and a half. The radiogram shows the condition at the end of seven years treatment (Fig 345)

CASE IX —The radiogram of this patient is shown simply to illustrate the differential diagnosis of the osteo arthritic hip from the other hips that have been shown (Fig 346). Note



Fig 345—Case VIII. Note evidences of extensive destruction of head of femur and of acetabulum.

the marked lipping, the periarthritic osteophyte, the mushrooming of the femoral head, and the increased density rather than porosity of the involved parts. (Compare especially with Fig 345.)

CASE X should be a lesson to those who are impatient for a cure and to those who favor the use of any form of tuberculin in the treatment of tuberculous joint disease. A boy of four years of healthy parentage eight months after an attack of measles was found limping with slight flexion and adduction

deformity, some sensitiveness, and with motion moderately restricted at the hip-joint. He was treated with a long traction hip-splint. At the end of two years he appeared to be well. There was motion in flexion beyond a right angle, good rotation, full abduction, and hyperextension. The parents believed the boy to be cured and treatment was discontinued.

Six months later the symptoms returned with some pain, more sensitiveness, and almost complete stiffness at the joint.



Fig 346 —Case IX. Osteo-arthritis.

The treatment was resumed. Again, after some two years, he appeared to be well, with good range of motion. Again treatment was discontinued. Again symptoms returned, with considerable flexion, marked adduction deformity, and great stiffness at the joint; but there was no pain or sensitiveness. An anesthetic was given, the leg stretched into moderate abduction, and put in a plaster spica.

In this the boy went to school, played ball, and did all the things an active boy of his age would do. After some six months in the plaster spica the parents consulted an eminent surgeon, and on his assurances of a rapid cure submitted to six

weekly injections of tuberculin, the plaster spica being continued. By the end of six weeks the boy was suffering constant pain in his leg and it was so sensitive that he not only was confined to bed but could not turn over in bed without help. At a change of the plaster spica an abscess the size of half an orange was found on his thigh. The tuberculin was discontinued, the



Fig 347—Case X showing convalescent leather splint in place



Fig 348—Illustrating short plaster spica and mode of locomotion on crutches and raised boot on sound leg preliminary to bearing weight on diseased hip

plaster spica continued and after four months he was once more able to get about and return to school. After a year more in the plaster spica followed by the convalescent leather splint (Fig 347) he was considered cured and has remained so but with an absolutely stiff joint (Fig 348).

CASE XI illustrates a rather unusual condition. A boy

was treated for hip disease by the late H. R. Allen, Sr., of Indianapolis, and pronounced cured when twelve years old. For twenty years he had no symptoms. Then at the age of thirty-two years the symptoms of the hip disease returned, and the radiogram revealed an encysted focus of disease in the ilium at the upper border of the acetabulum (Fig. 349).

CASE XII illustrates some of the difficulty in the diagnosis of hip conditions. The girl was nine years old. The mother thought that there was some trouble just below the right hip



Fig. 349.—Case XI.

because the child complained of the leg getting stiff. The record of my examination is as follows:

Lying on the face the spine is straight and flexible. There is no psoas contraction. On back the limbs measure the same and all joint motions are normal. She can sit on the table with knees straight and touch her toes. No sign of disease in spine or hips.

But the radiogram shows a beautiful example of beginning osteo-arthritis.

CASE XIII was treated for many years in early life for hip disease at first by one eminent general surgeon and then by another and later by a notorious orthopedist. For more than thirty five years he has believed that he suffered from hip disease. He was brought to the hospital on a cot with weight attached to his leg from a town a hundred miles away. There were no clinical symptoms on examination except shortening.

The radiogram shows that there is a coxa vara that developed at the beginning of his trouble when he was an overgrown and hard worked farmer boy of seventeen years (Fig 350)

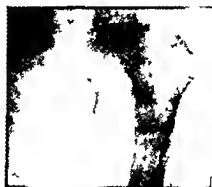


Fig 350—Case XIII

CASE XIV is a case that ought not to have been mistaken for hip disease but was by the general practitioner, who referred the case to me. The woman was thirty four years old. Two years before she had pains in her thighs and was treated for rheumatism. She was left with some stiffness in both limbs. After a year swelling appeared in the left thigh but she had no regular pain. At times there would be shooting pains here and there in the legs that would cause her to cry out. After the swelling appeared in the left thigh she took to the use of crutches which she continues. Her husband has abandoned her, his character is not well defined possibly irregular. Patient has had two miscarriages no living children.

Examination—Lies on the table with the left leg somewhat

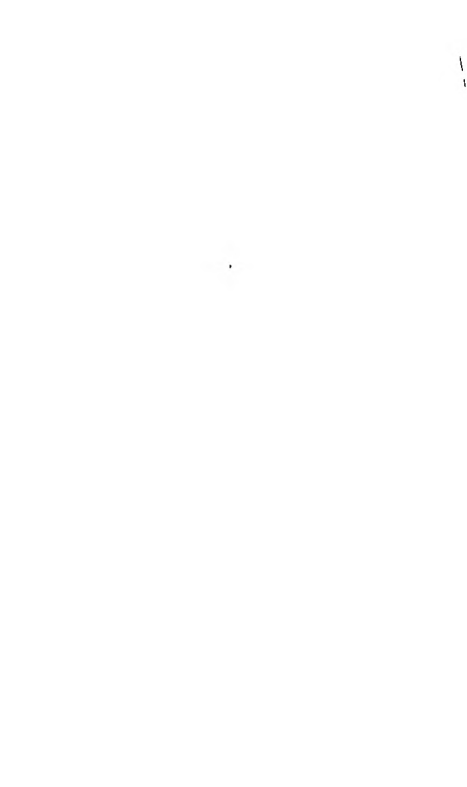
adducted and 2 inches short. All movements at the hip-joint are free, indeed, freer than on the other side, and painless. There is no muscular atrophy. There is a "crunching" feeling at the hip on rotating the limb.

Feeling to pin-prick delayed. Sways on standing with eyes closed. Knee-jerks absent. The radiograph shows apparently some remains of the femoral head in the acetabulum; all the rest of the femoral head and neck gone (Fig. 351). Diagnosis: Tabetic hip.



Fig. 351—Case XIV.

The lesson that this clinic appears to teach is that the diagnosis of tuberculosis at the hip-joint is not always easy; that the prognosis in any individual case as to duration of the disease and ultimate result is impossible; that osteo-arthritis, particularly in children, does not always give a stiff hip, as we expect it to do in adults; and that a certain differentiation between Perthes' disease and tuberculosis of the hip is not always possible.



CLINIC OF DR. ALBERT E. HALSTEAD

ST. LUKE'S HOSPITAL

HEREDITARY DEFORMANS CHONDRAL DYSPLASIA

Summary: Case illustrating the clinical characteristics of the disease; pathology—a disturbance of the intermediary cartilages during the period of skeletal growth; cure unknown, but palliation usually possible; etiology still a manner of speculation.

HISTORY

MRS. F., married, age twenty-eight, white, native of United States, for the past fifteen years has complained of swelling of the right side of face, jaw, frontal region of head, and of left arm near elbow; prominence of the eyes, with dimness of vision, headaches, dizziness, impairment of hearing on the right side, and pain and tenderness over left arm near elbow. About fifteen years ago she first noticed that the right side of the nose was becoming prominent. This increased in size and caused her no pain. In 1907 she had x-ray pictures taken and was operated upon, but on account of some difficulties with the anesthetic the operation was not completed, nor again attempted before she left the hospital. At this time she noticed that the lower jaw on the same side was increasing in size, and shortly after that a swelling appeared on the top of the head. There was never any pain associated with any of these growths. Five years ago her left arm began to pain her, beginning in the shoulder and extending down the whole arm. Soon after she noticed a swelling just above the elbow, which pained her and was tender to touch. Her arm became weaker and it has never regained its normal strength. It is still somewhat painful.

For several years her eyesight has been failing and her eyes have become prominent. During the last two months she has noticed that her hearing is impaired on the right side and that

she has headaches which have become more frequent in the last month. These headaches are generally over the vault and are not constant or regular in occurrence. The last two months she has had dizzy spells especially when she stoops or turns suddenly. She has had some sore throat and dry cough.

She has had two children. One died at fourteen months. One is seventeen months old and is in good health. She nursed this baby until it was thirteen months old. She had one miscarriage at two months three years ago. She has not menstruated since the birth of the last baby. Her appetite is fair, bowels irregular and she has lost about 10 pounds in weight during the last year.

Family History—Mother and father are both dead, both deaths being due to pneumonia. She has four brothers and two sisters living and well and none of these have any deformity. In her mother's family there were 7 children that were born dead.

PHYSICAL EXAMINATION

General—The patient is a white adult female, age twenty-eight. She is poorly nourished and has the appearance of having had a recent illness.

Head—At the junction of the *parietal suture* in the midline anteriorly a transverse, round bony outgrowth is palpable. It is not tender. There are no other palpable bone growths on the skull. This growth is about the size of a small walnut.

Ears—Appear normal. Hearing however is only fair by watch tick. Less acute on the right side.

Eyes—There is a moderate exophthalmos. The width of the palpebral fissure is increased. There is an external squint with an occasional diplopia. There is no increase in ocular tension. There is no loss of function of the eye muscles. The range of vision is fair by the finger test. Pupils are unequal in size. Neither react to light, both react to accommodation. The conjunctivæ are negative.

Nose—There is a bony outgrowth occupying the right lower aspect of the nose extending from the tip to the external nares. There is a similar growth on the left side extending from the root

of the nose out, the thickness of a finger. No perforation of the septum is found. The septum is deflected to the right. The right nares is practically occluded. The left nares appears clear. On attempting to breathe *both nares are obstructed high up*.

Mouth.—Negative. The lower front teeth appear rather small and irregular in size. Tongue is negative. Attached to the inferior maxilla of the left side extending from the symphysis menti there is a bony growth which is round and slightly roughened. It is firm and tender on palpation. It is about the size



Fig. 352.



Fig 353.

Figs. 352, 353 —Case of deformans chondral dysplasia. Note bulging of eyes and deformity of mandible caused by the tumor growths

of a small orange. On the right inferior maxilla, beginning at the symphysis and extending along its entire course, there is a bony growth. This growth is hard and not tender and rather irregular in contour, and is about 6.5 cm. in width at the angle. The right side of the face is considerably distorted (Figs. 352–354).

Neck.—Negative except for a few small palpable lymph-nodes. The chest is poorly developed. The supra- and infra-clavicular fossæ are depressed. The supraspinatus fossa of the

left side posteriorly is depressed. The ribs and clavicles are very prominent and appear normal in size. The breasts are also normal.

Lungs—Expansion good. No areas of dulness over the lung anteriorly or posteriorly. Percussion if anything is hyper-



Fig. 354—Roentgenogram of skull of patient shown in Figs. 352-353. Note diffuse thickening of skull bones as well as shadows of meningiomas and maxillary tumors.

resonant. Vocal fremitus and breath sounds normal. Width of the apices and bases are normal.

Heart—Negative. Kidneys and spleen are not palpable.

Extremities—Right arm is normal. On the left arm there is a bony growth occupying the lower third of the left humerus and

extending into the elbow-joint. This is round and rather rough on its surface. It is hard and not tender. Ankylosis of the left elbow is present and motion is greatly limited. The forearm is apparently normal. No loss of function is noted in the muscles of the forearm (Figs. 355, 356).



Fig. 355.



Fig 356.

Figs. 355, 356—Roentgenogram and photograph of left arm showing tumor described in text

Legs.—Negative except for a traumatic scar over the anterior surface of the left tibia. Both tibiae appear shortened and slightly bowed anteriorly. On the whole, the lower extremities seem to be shorter than usual for a patient of her stature.

Genitalia—Negative

Reflexes —Knee jerks are absent. There is a negative Kernig sign, negative Babinski, and ankle clonus and Romberg sign.

The diagnosis is hereditary deformans chondral dysplasia. This condition is also known as multiple cartilaginous exostosis and multiple congenital osteochondroma. It is a definite clinical entity and has recently been studied by Chrenfried. Although first recognized by Hawkins in 1839, the first complete study was made by Ollier in 1899. The characteristic findings in this disease are:

1. The occurrence of multiple, more or less symmetric osteo cartilaginous growths upon the skeleton, being found on or near the ends of the long bones, but occasionally, as in our case, on the bones of the skull and face. The pelvic bones and vertebrae have also been known to be the site of these growths. These exostoses are generally benign, although cases have been observed where they have taken on a malignant character.

2. The disease is hereditary in a large percentage of the cases. Keinecke traced 172 cases in 36 families. In 12 the disease passed through two generations, in 15 it ran through three generations, and in 2 through four generations. In Chrenfried's collection of 235 cases heredity was traced in 176. In our case there seems to be no other member of the family affected. In our clinic four years ago we treated two brothers who had multiple cartilaginous exostoses. In this family the father was also affected.

3. Other characteristic malformations are frequently, though not always, associated with these osteochondromata, namely, a low stature due to shortness of the lower limbs. As a rule the lower limbs are more shortened than the upper. There is also frequently observed a relative shortening of the ulna and fibula, producing, by the relative overgrowth of the radius, an apparent luxation of the bone at one or both extremities. In the lower extremity the lack of growth of the fibula causes a pes valgus. These deformities may be in evidence before the exostoses make their appearance. The latter may be insignificant or may never appear. The patients usually consult their physicians for some secondary manifestation of this disease, such as

the pes valgus or because of painful pressure of one or more growths, as in one of our cases in which a large cartilaginous tumor situated on the anterior surface of the upper end of the femur caused difficult and painful locomotion. In the case presented the large growth on the lower jaw causes an unsightly deformity. The exostosis on the skull is extremely sensitive to pressure, that on the superior maxilla causes an obstruction to the nasal passages, and those on the arms are only slightly painful and cause but little inconvenience. You also note that the x-ray of the cranium shows a thickened skull resembling concentric hypertrophy. The disease also causes disturbances of vision and hearing, which we find present in this case.

Pathology.—The disease occurs most frequently in males. Reineke traced a proportion of 3 males to 1 female. Ehrenfried had 5 males to 2 females. It occurs in all races, in all countries, and in all lower animals. The underlying pathologic change is a chondrodysplasia affecting the metaphyses of the long bones principally. The epiphyses are seldom deformed. The intermediary cartilage is irregularly formed, and frequently prematurely ossified cartilaginous deposits are found along the shafts of bone. These may remain unossified or present partly calcified areas. The cartilaginous deposits later develop into osteochondromata or chondromata. In fact, we may say that the disease represents a disturbance at the intermediary cartilages during the period of growth of the skeleton. This dysplasia of the normal process may occur wherever bone is being laid down in cartilage. In the radiogram we see what appears to be a cystic change in the ends of the long bones. These light spaces are due to the irregular distribution of cartilage cells.

The prognosis in a case of this character is uniformly bad. Nothing in the way of a cure is known. When the exostoses limit the movements of joints by size and location, they may be removed. In the case previously referred to that was treated in this clinic removal of large growths from the upper ends of the femurs permitted flexion of the thighs and relieved the pain that before had been intolerable when walking was attempted.

Etiology.—Little is known as to the cause of dysplasia. Tordens considered that the underlying cause was a disturbance of the central nervous system. Other authors have seen a relationship between the disease and disturbance of function of the thyroid. It has been noted that in goiterous locations this disease seems to be more common. The arrest of development, evidenced by the shortened statures, has been thought to be allied to the arrest of growth seen in the cretins. Others see a relationship between it and secondary or late rachitis. We may say, however, that at the present time the etiology is unknown.

CLINIC OF DR. MALCOLM L. HARRIS

HENROTIN MEMORIAL HOSPITAL

HERNIA OF THE BREAST

Summary A girl of fifteen presenting a swelling of the right breast due to escape of the glandular elements into subcutaneous tissues through an abnormally large aperture in their fascial covering, treatment—palliative and radical, result one year after operation

THE case which I am about to describe is quite unique in my experience. Miss B., a girl about fifteen years of age, was brought to me by her mother on account of an apparent enlargement of the right breast. The girl was well developed physically, and her health in every respect quite good; menstruation appeared at the age of thirteen and was normal in type and regularity. With the appearance of menstruation the breasts began to enlarge in the usual way, but about a year ago it was noticed that the right breast, which was slightly larger than the left, was becoming more prominent about the nipple. It was on account of this prominence of the breast about the nipple that led the mother to seek the advice of her family physician, who referred the case to me.

The girl, who was the picture of health, had had no serious illness, and, aside from the condition of the breast, had no trouble whatever. An examination of the breasts showed the right slightly larger than the left and both quite well developed for a girl of her age. The nipples were small and flattened. From the center of the right breast there protruded a large dome-shaped mass, measuring 7 to 8 cm. in diameter at the base and raised about 6 to 7 cm. from the surrounding surface, the nipple occupying the apex of the mass (Fig. 357). The areola, which was normally pigmented, was considerably enlarged and covered

the top of the mass. The mass felt firmer than ordinary fat and was distinctly lobulated. Surrounding the base of the mass could be felt a well defined subcutaneous ring with a distinct rather sharp edge (Fig 358 1 A). The ring felt exactly like the opening at the umbilicus in an umbilical hernia except the edge of the ring was not so thick while the mass felt very much like a bunch of omentum in an umbilical hernia. With gentle pressure the mass could be pushed back through the ring very

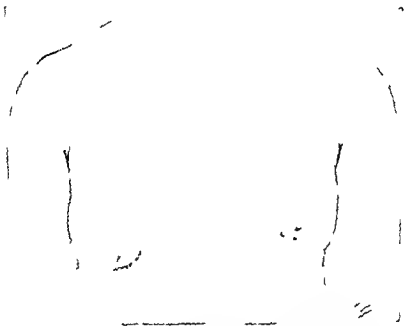


Fig 357 —Hernia of breast. Note marked protrusion of right breast in region of nipple

much as one reduces an ordinary hernia when the breast resumed a normal appearance except the areola which became wrinkled and puckered. On removing the pressure the mass immediately reappeared by simply sliding out again through the ring. As the mass appeared the rotundity of the breast diminished accordingly. It was perfectly evident that the mass was the gland proper which slipped through a rather large opening in the subcutaneous fascia which normally covers the breast and retains it in place

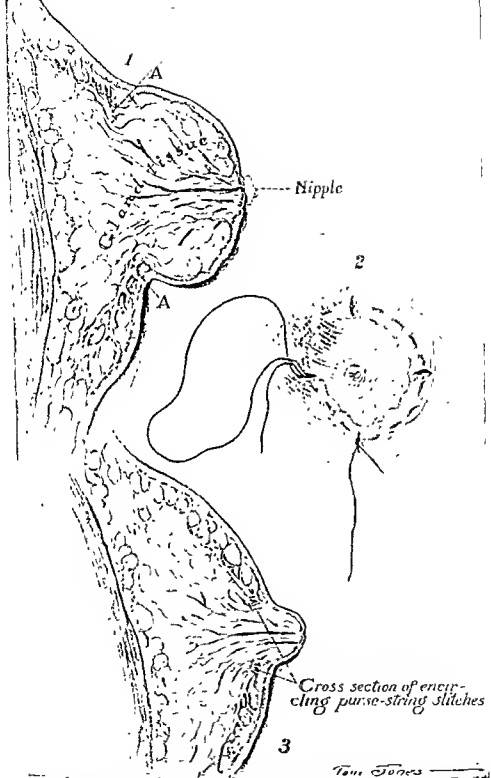


Fig. 358.—1, A, Cross-section of breast before operation, showing relative width of opening in fascia and protrusion of breast tissues. 2, Insertion of purse-string sutures. 3, Condition after operation was completed.

The whole process was so analogous to an ordinary rupture that the term hernia of the breast seemed to me not inappropriate. The interlobular connective tissue septa which are attached to or become continuous with the subcutaneous fascia and which fix the breast quite firmly as a rule to this fascia seemed to be practically absent or so stretched as to offer almost no resistance to the gland sliding around under the skin and slipping out through the opening in the fascia when it was not retained by pressure.

As there was a slight tendency for the left breast to develop the same condition a double breast supporter of firm webbing was made and applied with instructions to wear it continuously. The support retained the gland nicely and there was no tendency for it to slip out while it was worn. The patient wore the supporter faithfully for a year at the end of which time as there was no improvement in the condition an operation was proposed to see if the gland could not be permanently restrained from slipping through the ring.

The patient was glad to have anything done which seemed to offer a prospect of ridding her of the necessity of wearing the supporter. Therefore in June 1916 the following operation was done. Under local anesthesia four small incisions each about 8 mm. in length were made in a radiating direction dividing the circumference of the areola into four equal parts. The incisions extended through the skin and were just within the ring of subcutaneous fascia through which the breast was escaping. A long straight needle armed with soft twisted silk was introduced through one of the small incisions so as to pick up the edge of the ring. Several bites were taken in the edge of the ring until the point of the needle had reached the next small incision 90 degrees removed when the needle was brought out. It was then reintroduced through the same opening and the next 90 degrees of the circumference of the ring taken up in the same way and the needle brought out at the next small incision. This procedure was repeated until the needle was finally brought out at the incision through which it first entered (Fig. 358-2). We now had a circumferential subcutaneous stitch in the edge of the

ring; three more stitches were placed in the same way, each a little farther out in the edge of the ring, making four rows of silk sutures surrounding the opening. The sutures were then drawn up, narrowing the ring (Fig. 358, 3), but leaving it large enough to give free passage to the ducts leading to the nipple, when the threads were all tied, the ends cut short, and the four small incisions closed with horsehair.

The scheme of the operation is well shown in the illustrations. After the operation was completed it was found that the gland was retained and the hernial protrusion no longer occurred. It was hoped that the silk, being non-absorbable, would not only act mechanically in restraining the breast from herniating, but that it would cause sufficient new connective tissue to be formed to permanently strengthen the subcutaneous fascia of this region, and thus prevent the recurrence of the hernia.

The result of the operation has been very satisfactory, and at the end of a year there has been no recurrence.

This case is quite unique. It is the only one of the kind that I have seen, nor have I been able to find a similar case reported in the literature. The condition is undoubtedly congenital in its origin, and it must be due to an imperfect development of the fascia covering the breast and of the interlobular connective-tissue fibers which normally fix the gland to the subcutaneous fascia and skin. This latter fault permitted the gland to slide freely beneath the fascia, and the defect in the fascia surrounding the nipple permitted it to slip through this fascia and lie directly beneath the thin skin of the areola.



CLINIC OF DR. E. WYLLYS ANDREWS

MERCY HOSPITAL

HEMANGIOMA OF BRAIN, INOPERABLE BY ORDINARY METHODS, TREATED BY BOILING WATER INJECTIONS AND HOT METAL POINT

Summary Patient presenting symptoms of intracranial tumor, discovery of angioma at operation; philosophy of the plan of treatment followed, differentiation between intracranial angioma and telangiectasis.

THIS lady, forty-four years old, has had well-marked focal symptoms referable to the right Rolandic area, papillitis, optic atrophy, and slight seizures pointing unmistakably to brain tumor. There is paresis in face, arm, hand, and leg of the opposite side, and progressively increasing headache and loss of vision.

Dr. H. T. Patrick has diagnosed "intracranial tumor" and advised surgical intervention. The large parietal plastic flap made over the affected area showed a slightly discolored outer table of the skull, bluish vessels showing through the thin bone in an unusual way. The first trephine opening exposed pulsating nevi of the diploë and had to be sealed with Horsley's wax. Next the trephine was placed at an adjacent point, and on slight pressure broke through the thinned outer table, opening large sinuses which seemed part of a hemangioma occupying the place of the inner table, diploë, and meninges to an unknown depth. The bleeding was arterial in strong pulsations and had to be held by pressure (Fig. 359, 1).

My conclusion was that if the vessels are from the meningeal branches they could be tied by further dissection, but that if the telangiectasis sprang from the middle cerebral it would be uncontrollable by external operation. I therefore tamponed the outer wound with bits of catgut and little grafts of the patient's

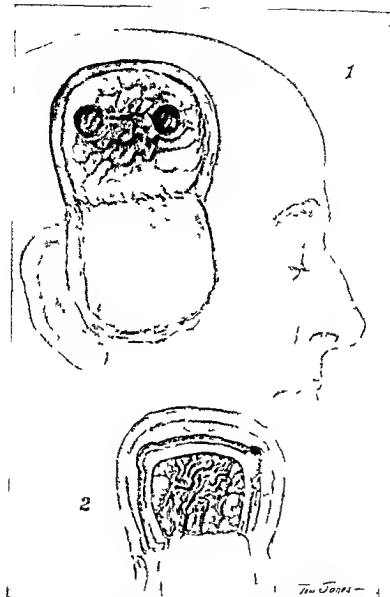


Fig. 359—1, Hemangioma of the brain and dura eroding tables of the skull 2 Telangiectasis (not malignant)

muscle, which controlled the bleeding without great pressure. Subsequently I injected boiling water in 1 to 4 c c charges,

puncturing the scalp and thin bone with a stout needle. After a few daily repetitions of this injection I operated again, taking counsel with Dr. Patrick, who decided that such a growth might be glioma, even though no solid mass was found near the surface. I now ligate the external carotid, and, on reopening the wound, find a very bloodless scalp and pericranium, but no cessation of the pulsation in the vascular mass. This demonstrates that its blood-supply comes from some deep connection with the cerebral vessels and makes free dissection unsafe. Doubtless in such a cavity bleeding could be stopped by packing against the bony margins, but at the cost of producing an intracranial hematoma of dangerous extent.

Dr. Patrick had suggested ligation of the internal or common carotid instead of the external, but I refrained from doing this, as both sides of the neck might need ligatures, causing, almost certainly, cerebral anemia and death.

I now use large heated copper cautery points—the ordinary soldering irons of the tinsmith—pressing them firmly against the bleeding masses after reflecting the old horseshoe-shaped flaps by removing the stitches of the first operation.

This seems to cause wide and deep coagulation, nevertheless not entirely checking the bleeding. Bone, pericranium, and probably dura, and a certain layer of deeper tissue are devitalized but not charred, the irons used being of a dull, not a glowing, heat. Over the eschar the pericranial flap is again sewed.

POSTOPERATIVE COURSE

Primary union took place, with no drainage and no delay in clean healing. Doubtless clean aseptic sloughs can be taken care of in wounds like other foreign bodies. The immediate relief from this treatment was very marked. No increase of paralysis, rather a decided improvement, set in. The eye-grounds cleared remarkably. As to the end-result, a most conservative prognosis is advisable, inasmuch as a tendency to recurrence will appear unless we obtain complete extirpation of the mass, especially if we are dealing with hemangioma rather than telangiectasis.

Two cases of intracranial telangiectasis were reported in 1915 by E. Sachs (*Amer. Jour. Med. Sci.*, II, 565). One of these seemed to be of dural origin and the other from the deeper vessels. Cushing draws attention to the vascular growths of the dura in association with trigeminal nevi. Adami and Virchow differentiate clearly between angioma and telangiectasis. The latter is a dilation of existing vessels, no neoplastic vessel structures appearing. In true angioma (hemangioma) new vessels are formed. They may be from capillaries, veins, or from arteries. In true neoplasms no vessels with three coats are formed. Sachs found in both his cases normal structures in the vascular walls. It is not a question of academic interest only, but of vast practical import, which type we are dealing with, since in telangiectasis cure by ligation can be obtained, while in true angioma nothing but complete excision offers hope of cure.

The patient shown has certain differential points leading to the fear that the growth was angioma rather than telangiectasis. These are to be summarized as follows:

1. *Angioma*.—Increased intracranial pressure must be expected, since there is a new growth inside the cranial walls. Convulsions are usually present, especially when the growth is near the cortex, but there may be no unconsciousness before or after the seizure. The intracranial pressure being increased by local encroachment, there are focal symptoms, such as motor paralysis or other signs pointing to cortical irritation. The optic atrophy will increase progressively until the vision is lost in one or both eyes, hemianopsia being detected early in many cases. The motor paralysis is also progressive, since the tendency is for the angioma slowly to enlarge at the expense of the other structures. The absence of nevi in other locations, as about the head and face, will help to differentiate angioma from telangiectasis. The absence of syphilis is best tested by a Wassermann made upon the spinal fluid or fluid from the ventricles.

2. *Telangiectasis*.—This other type of intracranial vascular growth is, in reality, an enlargement of the normally existing vessels. The growth does not, as a rule, produce increased

intracranial pressure. It might be almost symptomless or produce but slight pressure symptoms (Fig. 359, 2). As a rule, no epilepsy or any form of convulsions appear, or if present they occur at long intervals. There are no paralyses or focal symptoms in most of the recorded cases. A number of these cases have been reported by Sachs in the American Journal of the Medical Sciences for 1915. As in hemangioma, the absence of all signs of brain syphilis is to be noted. In not a few of the recorded cases the clue to the pathology was found in the existence of other nevi, as of the head, face, or skin in general, thus proving the tendency in the individual to a congenital telangiectasis in various membranes of the body.

CLINIC OF DR. DALLAS B. PHEMISTER

PRESBYTERIAN HOSPITAL

BRAIN CYST FOLLOWING SKULL FRACTURE

Summary: Jacksonian epilepsy and headache developing four years after compound fracture of skull; operation—discovery of cyst—treatment by gauze packing; peculiar postoperative course; causes of cyst formation.

THIS patient, L. S., age twelve, was admitted to the hospital February 20, 1917, because of attacks of epilepsy which he has been having during the past four months.

He was a normal, healthy child up to four and one-half years ago, when he was struck on the left side of the head above and back of the ear by a pole from a hay-wagon. The blow rendered him unconscious and produced a compound fracture of the skull from which some brain tissue escaped at the time. Consciousness was gradually regained after forty-eight hours and the wound healed promptly with little or no infection. The father states that no necrotic bone or other tissue was removed. He was confined to bed for three and one-half weeks, after which his condition returned to normal. No paralysis, disturbances in speech, or other focal symptoms were noticed during his convalescence from the injury. He has attended school regularly. No special mental disturbance has been noticed, although the father says that he has been perhaps more quiet and solitary than before. During the past year he has had repeated attacks of headache, usually in the occipital region, lasting for a few hours, but not accompanied by nausea or vomiting.

Four months ago while in school he suddenly developed a queer feeling and jerking in the right hand, which was rapidly followed by unconsciousness and jerking of the entire body. Consciousness soon returned, but he felt drowsy, and had a

headache for the next twenty four hours Vomiting occurred soon after the attack.

He was then apparently all right except for frequent headaches until one month ago when he had a second attack. It started with twitchings in the right hand which caused him to scream and grab it with his left hand. The twitchings extended to the entire body and lasted about two minutes but he did not lose consciousness. Weakness and headache followed. Since then he has had similar attacks which were severe enough to cause him to fall to the floor, but without loss of consciousness.

There has been no change in his physical or mental condition since the attacks began. He has wet the bed most of the nights during the past year, which he had not done since infancy, but no nocturnal epileptic attacks have been observed.

Father is living and well. Mother died at thirty six of child birth. One brother and one sister living and well. No nervous diseases in the family.

Physical Examination —The patient is a well-developed male child, somewhat reserved and backward in appearance. He answers questions intelligently and shows no defects in speech or motion. There is a scar and a moderate uneven depression about $1\frac{1}{2}$ inches long over the left parieto-occipital region extending downward almost to the left mastoid. It is $1\frac{1}{2}$ cm wide above and 1 cm wide below. Palpation reveals the absence of bone over a portion of the depression and pulsation can be seen and felt.

Eyes —Entirely negative. Vision and eye grounds normal. No nystagmus.

Smell taste and hearing normal.

A physical examination of the rest of the body was negative except for a feeble Babinski on both sides more marked on the right.

The x ray picture of the head (Fig. 360) shows an elliptic defect of the skull about $1\frac{1}{2}$ inches long, extending upward and slightly backward from the top of the left mastoid. There is no evidence of any fragments of bone within the brain substance and only a slight depression of the posterior margin of the upper portion as seen stereoscopically.

A diagnosis of traumatic epilepsy was made, but the exact nature of the changes within the cranial cavity was not predicted.

At operation, two days after admission, a horseshoe-shaped flap, with its base on the level of the upper limits of the mastoid, was turned down from the parieto-occipital region, the anterior margin of the bone-flap bordering on the linear defect in the skull (Fig. 361, 1). A large cyst could be seen and felt in the anterior

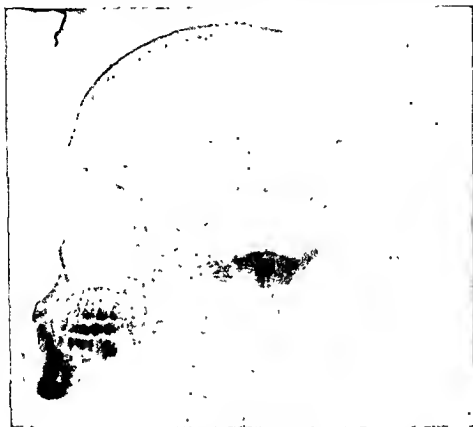
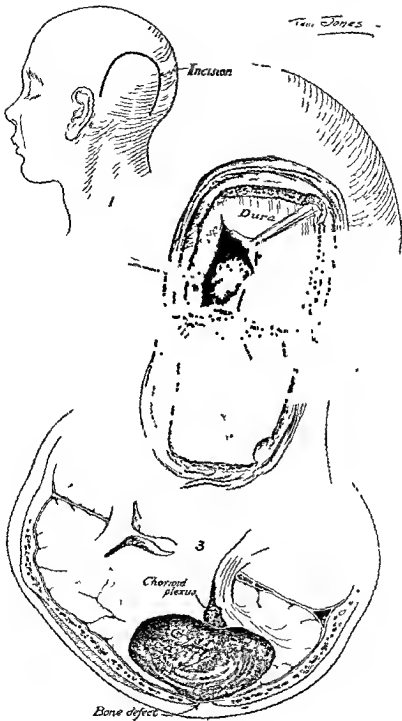


Fig. 360.—Roentgenogram showing fissured defect in skull at site of old fracture.

portion of the exposed area and in the region of the defect in the skull, where the dura mater was irregularly thickened and scarred (Fig. 361, 2). The cyst was opened in this region and about 200 c.c. of a clear colorless fluid escaped, or was sponged out. The membranes were fused into one layer over the surface of the cyst, which extended deep into the substance and well anteriorly and posteriorly. There was a thin fibrous lining to the cavity,



which had smooth walls without any trace of convolutions or gyri. On the inner wall of the cavity a reddish mass containing blood-vessels could be seen, which was taken for the choroid plexus of the lateral ventricle (Fig. 361, 3). That the vessels were not those of the flattened out cortex seemed evident, as they did not run to the superficial portion of the cyst wall. No pieces of bone could be felt along the wall, and the depression in the bone-flap was very slight.

We were confronted with the interesting problem as to the best method of dealing with this large cyst cavity. Simple drainage, fat transplantation, and packing with gauze were thought of, and the latter procedure finally decided on. The space was packed with a 1-inch plain gauze strip in the hope that the lining would be obliterated and that the brain substance would shift, gradually filling in the cavity as the packing came out. It was removed gradually, beginning on the third and ending on the ninth day after operation, when a gauze strip was inserted. There was a profuse discharge of a slightly blood-stained serous fluid during the first ten days, after which it gradually decreased and ceased soon after the removal of the gauze drain on the twentieth day. Examination about this time with a probe showed the cavity either narrowed down to a sinus or pocketed and shut off from the external opening.

The patient has run a very interesting postoperative course. The temperature has fluctuated greatly. On the afternoon of the operation it went to 106° F., but fell to 101° F. by the next morning. It stayed about this point for three days, when it again went to 104° F., and fluctuated between 101° and 104° F. for about one week. After this, during the past four weeks, it has been very irregular, running between normal and 100° F. for two to four days, then jumping to 102° or 104° F. of evenings for a day or two.

Fig 361.—Steps of the operation: 1, Horseshoe-shaped incision through all the soft tissues down to the bone. 2, An osteoplastic flap has been turned back and the dura opened, exposing interior of large cyst. Note smooth edges of old defect in skull at anterior margin of flap and operative opening in skull. 3, Schematic drawing of horizontal section of head to illustrate position of cyst and its relation to choroid plexus, dura, and site of old fracture.

During the first four days after operation he felt fairly comfortable was rational and had no headaches. On the fifth day he had an attack. The right hand became numb he felt very dizzy and cried out but there were no twitchings or loss of consciousness. During the next two weeks his mental condition remained fairly good. Then he gradually became dull and irritable crying out at frequent intervals. Three weeks ago the right side of the body began to show signs of paresis which condition has increased until now it is very marked especially in the arm and leg. The mental confusion has gradually increased and now he has a well marked sensory aphasia. For the past two weeks he has vomited from one to three times nearly every day and at first complained of some headache but lately his mental condition has been such that it is impossible for him to make his complaints known. All the symptoms are increased with the sharp elevations of temperature. Dr. Peter Bassoe has gone over him recently and examined the eye grounds but has found no changes in them.

It is difficult to know just what is producing the boy's condition. With the irregular temperature at times very high the motor and mental disturbances the vomiting and gradual loss in general one has to consider very strongly the existence of an infection with perhaps abscess formation in or about the region of the cyst. But the wound while it discharged a serous fluid did not at any time appear infected and repeated leukocyte counts have ranged between 8000 and 12 000 except one count of 23 000 on the fourteenth day.

Another explanation might be found in the enormous shifting of brain tissue filling in the cyst cavity as the packing was removed thereby disrupting cerebral function and interfering with its heat and other centers.

We know that fever results from a variety of cerebral lesions. Hemorrhage especially into the ventricles may cause a very marked elevation of temperature. Krebil claimed that there is a heat regulating center which is disturbed by a lesion between the frontal end of the thalamus and the corpora quadrigemina. Jakob and Roemer state as a result of animal experimentation

that there is no circumscribed heat center in the cerebrum proper, but that irritation here and there, as in the region of the basal ganglia and especially of the walls of the ventricles, may produce a rise in temperature.

Operative interference with the brain in man is frequently followed by marked temporary fluctuation in the temperature, but, of course, could not be the cause of the protracted temperature in this case.

The method of cyst formation is also of great interest. We know from the history that the meninges and brain were lacerated and that brain substance escaped from the wound; also that at operation the cyst extended deeply into the brain substance, apparently bordering on the lateral ventricle, and that no traces of convolutions could be seen on its wall. Hence it seems quite certain that the cyst developed in the injured brain substance. The source of the fluid is a matter of conjecture, but it probably came from the choroid plexus, bordering on the inner wall. The cyst cavity was completely shut off by adhesions from the pia-arachnoidal space, consequently the fluid could not have come from this source.

The commonest form of cyst aside from cystic degeneration of pia gliomas is that from the pia-arachnoid, arising from localized inflammation, or trauma, or occasionally congenital in origin. This form is ruled out in the present case because of the anatomic findings that have been enumerated. Transformation of a hematoma into a cyst is the usual occurrence, but its fluid contents are stained dark brown due to the presence of the unabsorbed hemoglobin.

SUBSEQUENT HISTORY

The patient left the hospital four days later. Stupor became more pronounced. No autopsy was obtained. Cause of death is in doubt. It was due either to infection, which got into the brain tissue without making any definite signs in the external wound, or to the marked cerebral injury from the shifting of the brain substance in the filling out of the cyst cavity.



CLINIC OF DR. NELSON M. PERCY

AUGUSTANA HOSPITAL

PARTIAL EVISCERATION THROUGH VAGINA DURING ATTEMPTED ABORTION

Summary: Anterior vaginal wall and bladder torn through and 20 inches of large intestine stripped of its mesentery and pulled out of abdomen during ill-directed and unsuccessful attempt to empty uterus; immediate laparotomy and successful repair of injuries.

HISTORY

THIS patient is a young woman twenty-six years of age. Her past and family histories are entirely negative. She has a child of three years living and well. Labor was normal. No other pregnancies previous to the present one.

The last menstrual period occurred on April 16th. On May 21st, the menstrual period being one week late, the patient decided she was pregnant, and, according to her story, attempted self-abortion by introducing a rubber catheter into the cervix. She further claims that a bloody flow accompanied by cramps over uterus began two days later, which was two days ago, and persisted until the evening of May 24th, at which time she first consulted a physician at his office. The physician decided that a completion of the abortion was indicated and proceeded to empty the uterus then and there. No anesthetic was used. "The doctor inserted instruments and worked for a long time, causing most excruciating pain and severe bleeding." After working about two hours the doctor decided he had perforated the uterus, as he encountered a loop of intestine in the vagina. An attempt was made to replace this and absorbent cotton was packed in the vagina to control the hemorrhage. She was then placed in an ambulance and brought to Augustana Hospital.

Examination —We find a well developed and well nourished young woman, conscious and rational but greatly exhausted and suffering pain through the lower abdomen. There is marked pallor, the respirations are 32 per minute the pulse rate is 130 per minute, but of fair quality. Blood pressure systolic 100, diastolic 75. Hemoglobin, 65 per cent, red blood corpuscles, 3 500 000 white blood corpuscles, 18 000. Differential count shows no normoblasts. There are 80 per cent polymorphonuclear leukocytes. Auscultation discloses a murmur, which we take to be hemic in type, over the cardiac area. The chest is otherwise negative. The head eyes ears nose throat neck, extremities, and reflexes are negative, save for marked pallor of the mucous membranes.

Palpating we find that the abdomen is tender over the lower portion. It is flat to percussion in the flanks. Local examination discloses blood soaked clothing and bleeding from the vagina. The vagina has been packed with cotton. Three wads of cotton are removed from the vagina and digital examination reveals a slightly soft cervix but no evidence of recent dilatation. The size of the uterus as nearly as can be determined, is only slightly larger than normal. On bringing the finger anteriorly from the cervix an opening fully 4 cm. in diameter is found in the anterior vaginal wall extending through the bladder into the abdominal cavity. A loop of intestine protrudes into the vagina and a large wad of cotton can be felt in the abdominal cavity through the opening in the vagina and bladder. We will perform a laparotomy on this patient at once.

OPERATION

Under ether anesthesia a low median incision is made. Free blood containing numerous clots estimated at from 1000 to 1500 c.c. pours out of the abdominal cavity. Three wads of cotton each about half the size of a man's fist come into view and are removed. The loop of intestine that we felt in the vagina upon digital examination proves to be the sigmoid flexure of the colon. The patient has an extremely long sigmoid flexure and a loop of this 20 inches in length has been separated completely

from its mesentery. The torn mesentery is still bleeding, and this is undoubtedly the source of the free blood in the abdominal cavity. There is also an opening extending through the posterior and anterior walls of the bladder and the anterior vaginal vault. It is about $2\frac{1}{2}$ inches in diameter, and practically divides the bladder into halves. The anterior surface of the uterus is entirely free from the bladder and vaginal attachments. The

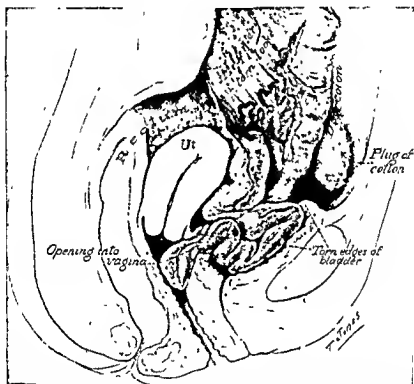


Fig 362—Illustration to show opening between vagina and bladder with large laceration of bladder. A loop of sigmoid devoid of mesentery fills bladder and protrudes into vagina. Note plug of cotton—one of several found.

tear in the bladder begins on the anterior wall near the urethra, and extends through the base of the bladder and the posterior wall almost to the symphysis pubis. The entire length of the tear is $4\frac{1}{2}$ inches. The uterus is somewhat enlarged and resembles a six weeks' gestation, and, as far as can be determined in this hurried survey, no instruments have entered the uterus (Figs. 362, 363).

the wound we close in the usual manner. A hypodermoclysis of 1200 c c of normal salt solution is now given and the patient will be sent to her bed.

Postscript—There was very little shock following the operation but the pulse ranged from 110 to 120 per minute for three days after which time it did not go above 90 per minute. The temperature did not go above 100° F at any time and remained normal after the fourth day. There was no leakage of urine urinations being normal after removal of the retention catheter on the tenth day. Beginning on the third day after operation 1 ounce of liquid paraffin was given by mouth morning and evening and on the fifth postoperative day an olive oil enema was given resulting in a free bowel evacuation. The bowels moved normally from this time on. On the fifteenth postoperative day there was a flow of bright red blood from the uterus but no fetus or evidence of placental tissue. The flow ceased in a few hours and it looks now as though the pregnancy may go on uninterruptedly.

CLINIC OF DR. CARL BECK

NORTH CHICAGO HOSPITAL

TENDO- AND NEUROPLASTY

Summary Two cases illustrating the practical application of certain methods of tendon and nerve repair—suture, interposition of foreign material, and autoplasmic grafts

THIS patient was thrown through the broken wind-shield of his automobile. His left hand was cut on the ulnar side of the palm about 1 inch below the wrist line, transversely, so that the nerves, tendons, and blood-vessels from the medial side of the forearm were all severed. He was taken to a doctor who stopped the hemorrhage and sewed up the wound, endeavoring at the same time to connect the severed ends of the tendons. His efforts, however, were not successful. About a week later the sutures sloughed out and a thick scar developed at the site of the junction of the tendons and the nerve. Three weeks later the patient applied to me for help.

His left hand was more or less helpless; the thumb and the first finger could be moved, although not through the normal range. The result of the injury and the subsequent suturing of the wound was such that the continuity of the ulnar nerve was entirely destroyed. There was anesthesia corresponding to its peripheral branches on the three medial fingers. The muscles of the inner portion of the hand were all useless; the three medial fingers were fixed in slight flexion. When the patient tried to bend the fingers the pull of the forearm muscles on the scar at the wrist was very noticeable (Fig. 365).

We decided to expose the region of the scar and, if possible, repair nerve and tendons by suture. Accordingly, we excised the scar and first located the proximal and distal ends of the ulnar

nerve The proximal was somewhat thicker than the distal portion, and the distance between them was so great that they could not be approximated It therefore became necessary to lengthen the nerve by cutting off a lateral graft from the proximal portion with which to bridge the defect The tendons were also brought together, repairing first the flexor carpi ulnaris which was done with considerable ease The tendons of the long flexor muscles were more difficult to handle, and it required a good deal of flexion of the hand to bring them together Never



Fig. 365 —Condition of the hand before anything in the way of plastic was done showing the paralytic condition of the fingers supplied by the ulnar nerve

theless we succeeded Then we placed the hand in an overflexed position over a gauze roller and a splint We kept the hand in this position for ten days Primary union took place and we were gratified to see that we had succeeded in a part of our task especially with regard to the little finger which by means of its special flexor tendon could be flexed to a certain degree The ring finger was drawn down considerably could not be flexed more and remained in the hyperflexed condition no matter what we did The middle finger was also drawn down to

a certain degree, but could be flexed somewhat in connection with the little finger. The thumb, because of its prolonged period of inactivity, had lost some of its function, although it was not injured. After many weeks of massage, electricity, and passive and active motion the patient became able to flex the hand almost to the normal degree, but he could not extend the fourth finger nor the middle finger because of the contraction which had taken



Fig 366—Condition after the first operation, showing contracture of the third, fourth, and fifth fingers

place in the scar. The fourth finger especially was a great drawback to every motion (Fig. 366).

We had obtained through our operation union between the flexors, but we had not obtained individual union of the flexor profundus and the flexor sublimis, so that there was no separate action of these two muscles. It occurred to me, therefore, since the hand could not be used in this fashion, that a second plastic

was necessary, namely, lengthing of the flexor tendons, so that the fingers could be extended. While this would not provide the superficial and deep flexors with the power of independent action and would, as a matter of fact, when performed in the manner which I intended forever preclude such a possibility, it would at



Fig. 367 — Condition shown in Fig. 366 corrected. (Photograph taken shortly after operation.) The incisions in the palm of the hand are covered with gauze strips.

least restore to the hand some degree of usefulness. My procedure was as follows:

I exposed the tendons of the middle, ring, and little fingers in the palm of the hand and cut each of the tendons which here lie one on top of the other, in such a manner that the superficial tendon was cut nearer to the wrist and the lower tendon nearer

to the finger joints transversely. I then immediately stretched each finger to its utmost straight position and sutured the free ends of the lengthened tendons, making only one tendon out of two. The incision was then closed with great care. It healed by primary union within a week (Figs. 367, 368).

Again the patient was treated by massage, electricity, and passive and active motion, and today you see that he can use his



Fig. 368—Dorsal view of the hand. Note that the fingers may be completely extended

hand, extending and flexing the fingers as far as the second joint, so that he can grasp anything (Fig. 369). Sensation has also returned. It is now seven months since the accident.

A similar very interesting operation on the tendons of the hand is that which was performed in the next case.

This gentleman is a foreman in a bakery. The skylight of

his work room collapsed and the patient was cut on the head and left hand by the falling glass severing two of the tendons in the hand. The extensor of the middle finger was cut right across by a pointed piece of glass and the two cut ends retracted about $\frac{1}{4}$ inch leaving the finger in a flexed condition. The tendon to the little finger was cut by a similar incision but a little closer to the wrist, the ring finger also suffered from a transverse incision of the tendons making it impossible to straighten out the little finger or the ring finger fully. A week had elapsed since



Fig. 369—Final result. The first and second phalanges of the third, fourth and fifth fingers of the left hand can be flexed and extended to the normal degree but the terminal phalanges remain in extension.

the injury when I first saw the patient. The first operation consisted in suturing of the extensor tendon of the middle finger under local anesthesia. It was very easy to expose the two transversely sharp cut tendon ends and unite them by suture.

The result was perfect and normal function was restored. Somewhat different was the condition in the little finger where the extensor tendon had retracted beyond the transverse ligament. It was impossible to find the proximal end of the tendon. It was easy to find the distal end. I therefore sutured the distal end of the extensor tendon to the extensor tendon of the ring

finger laterally, thinking that they would act in unison, but I was disappointed. The finger dropped, as there was not enough traction on the tendon, and when the patient returned to work the little finger was always in the way. I therefore decided to attack the case once more. At this operation I exposed the retracted portion of the extensor of the little finger and filled the gap produced by the retraction of the muscle, which measured about $\frac{3}{4}$ inch, with silk, extending the finger as much as possible, and in that way producing marked hyperextension. Both operation wounds healed by primary union and the silk tendon is now working just as well as the natural tendon. The finger is now extensible almost to the normal with the other fingers and is no longer in the way of the working hand.



ELEPHANTIASIS AND ITS TREATMENT BY THE HANDLEY OPERATION

Summary: Lymphedema of leg following radical extirpation of inguinal glands; restoration of lymph drainage by the subcutaneous implantation of silk threads

ABOUT eight years ago this patient, a factory foreman, was admitted to the hospital with a swelling in the left inguinal region, mostly inferior to Poupart's ligament. The absence of any syphilitic or other infection from the genitals and the preponderance of glandular elements made it probable that we had to deal with a growth of the lymphatics glands—a lymphoma. The pain due to the pressure of the tumor upon the nerves in the neighborhood, especially upon the anterior crural nerve, was very severe. Radical extirpation seemed the most reasonable and promising treatment.

The extirpation was made very radical and every vestige of gland tissue was removed clear down to the large vessels, which were, however, not disturbed. The external saphenous vein had to be ligated. A slow union took place extending over several weeks, a more or less serous or rather lymph-like discharge persisting for some time. However, all discharge eventually ceased, the wound healed, and the patient returned to his occupation.

In the course of time the limb on the operated side gradually increased in circumference. The greatest extent of the enlargement was below the knee, but it extended above the knee nearly to the hip. This enlargement seemed to have its seat mostly in the subcutaneous fat. The skin became very hard and unyielding. During the night the swelling slightly receded, but never disappeared. The patient tried to control the swelling by means of rubber stockings and bandages, but without avail. For a while he presented himself at intervals for examination, but during the last five or six years I lost track of him.

drawn on through and the thread pulled up so that its unarmed distal end disappeared beneath the skin. Next the needle was introduced through the same opening where it had come out and another subcutaneous suture was made of about the same length. This procedure was repeated again and again until we reached the neighborhood of the crista ili. There the thread was cut so that its end dipped under the skin and left for healing.



Fig. 372.—Front view of patient after operation. The legs much reduced in size. The location of the threads indicated by the series of scars visible on the leg and thigh.

The immediate result of this operation with the introduction of two threads was, as you see (Fig. 372), a considerable reduction in the size of the limb. In order to keep the limb from expanding too much during his very hard work, a leather shoe or rather brace was made which passed around the whole limb from below clear to his hip and was laced so that he was comfortable when wearing it. After a short time, however, the patient felt so well

that he discarded this, and although there is some swelling, more than is shown in Fig. 372, the limb remains very much smaller than it was before the operation, and there is no doubt that circulation of lymph alongside the threads has established itself, and that the final result is a considerable improvement. There are two threads introduced in this case, but it would perhaps be advantageous to pass a third thread along the entire posterior aspect which is still connected with the lower limb through the lymphatics.

CLINIC OF DR. HERMAN L. KRETSCHMER

ALEXIAN BROTHERS HOSPITAL

HYDRONEPHROSIS DUE TO KIDNEY STONE: REMARKS ON THE DIAGNOSIS AND TREATMENT OF RENAL CALCULUS

Summary: Systematic study of a case leading to the correct diagnosis; deductions as to treatment; indications for pyelography; fate of kidney stones; methods of diagnosis—their uses and limitations; indications for operation; three operative procedures available—the indications, advantages, and disadvantages of each; treatment of hemorrhage.

MRS. R. P. D., age fifty-four, referred by Dr. John McClellan. At present her only complaint is pain in the left side. The patient has been troubled with this pain off and on for the past twenty years. The first time she noticed this left-sided pain was in 1896. The pain was present then for a month or more. She was then free from pain for ten years. Ten years ago she had another attack, and the attacks have been fairly frequent ever since. The last attack began three weeks ago. At this time the patient worked harder than usual and thinks that this brought on the attack. The pain is of a dull, throbbing character in the left lower quadrant of the abdomen. The attack lasts about a month, and then she is free from pain for three to five months, when another attack comes on. The patient states that the pain is always located to the side and sometimes in front. Certain positions seem to make the pain worse, but what positions she is unable to state. She always sleeps on the left side to prevent an attack of pain. The pain is not distinctly worse at any part of the day. There is no accompanying nausea or vomiting. The patient has never found anything that will stop the attacks except massage. Such treatment will stop the pain, and at one time there was no recurrence for five months. Never had ab-

dominal cramps or blood in the urine and only very recently has she had nocturia. Associated with these attacks of pain is a feeling of depression. She has some gastric distress and has a great deal of gas and rumbling, associated with soreness in the epigastrium. Otherwise her history is negative.

General physical examination is negative. Examination of the abdomen: On palpation a tumor mass is felt in the left upper quadrant. It extends $2\frac{1}{2}$ cm. beyond the midline and about 2 cm. below the level of the navel. Above it extends under the ribs. The surface is smooth and the margins are round. It is of firm consistency. The tumor mass cannot be moved about.

Cystoscopic examination of the bladder is negative. Ureteral catheterization is easy and without obstruction. The urine from the right side is clear. Microscopic examination is negative. The urine from the left side is turbid. Microscopic examination shows the presence of pus. Cultures of the urine collected from the right side have remained sterile. Cultures from the left side show a pure culture of *Bacillus coli*. Phenol-sulphonephthalein test—Right kidney: The dye appeared in seven minutes. Output for one hour was 42 per cent. Left kidney. The dye appeared in twenty-five minutes. Output for one hour was 5 per cent. Roentgen ray examination showed the presence of multiple calculi in the renal pelvis.

Because of the presence of pus and *Bacillus coli* and the impaired function of the left kidney and the presence of shadows in the x-ray plate, it seems that the diagnosis of multiple renal calculi is perfectly clear. The only other lesion that one might have to consider with this evidence would be the possibility of calcifications in the spleen. Calcifications in the spleen are very rare and would not be associated with the previously mentioned ureteral findings. I think, therefore, that one is perfectly justified in excluding the spleen as a cause of the pain. The question might be raised why a pyelogram was not carried out. From the evidence at hand I believe one is justified in assuming that the patient has calculi in the renal pelvis and that these calculi have produced obstruction. This obstruction gives her attacks of pain, and as a result of this mechanical

obstruction a hydronephrosis has developed behind the stones. It is a well-known fact that a pyelogram gives us information that, many times, one cannot obtain in any other way. It is equally important in doing a pyelography to select the cases in which the pyelography should be done. In our clinic in the Presbyterian Hospital we never do a pyelography unless we cannot make the diagnosis in any other way. I think on the evidence submitted, the diagnosis is clear and that it is not necessary to do a pyelography, and, furthermore, where one is dealing with large hydronephroses, patients tolerate pyelography very badly because of the fact that the retention of the salts used in performing a pyelography produces a general and a local reaction. Pyelography is not a method to be used indiscriminately. In some cases in which pyelography has been performed, enormous infarcts in the kidney have developed, necessitating removal of the kidney, so that this procedure is not entirely free from danger.

Under ether anesthesia, therefore, we will operate on this patient at once and will perform a nephrectomy. With a kidney the size of this one, and from the fact that she has multiple calculi, and in view of the fact that she has an infection, and because of the fact that she has a very low pbthalein output, I believe we are justified in assuming that nothing of the kidney remains but a mere shell, and that to remove the stones through a pyelotomy incision, and to leave this dilated, saccular kidney behind would be a sad mistake. I think the reason why the patient obtained relief by massage is due to the possibility that the stones are movable and that with the massage the stones were moved away from the outlet and urinary drainage would be re-established, relieving her of the pain.

We will make the usual oblique kidney incision, making it longer than we usually do because of the enormous size of this kidney. The skin and deep fascia are quickly divided. The lumbar muscles are divided, no attempt being made, because of the size of the tumor, to do a muscle-splitting operation. The transversalis fascia is divided, the perirenal fat comes into view, and is incised, and the process of freeing the kidney is be-

gun The upper pole of the kidney is very firmly adherent to the diaphragm so that we must proceed to break up the adhesions slowly so as not to perforate the diaphragm and produce pneumothorax The height of this tumor can be seen by observing that my arm to the elbow is inside the wound With much difficulty the kidney is finally freed but before it can be



a. 573—Specimen removed at operation

delivered it will be necessary to increase the length of this incision forward One might perhaps be able to remove this kidney without this additional incision by passing a trocar into the kidney and removing the fluid This however I would not like to do because we know that this urine is infected The kidney has been pulled into the wound and the entire pedicle

ligated *en masse* in two portions. In order to ensure thorough hemostasis I shall make use of heavy silk ligatures, and no attempt will be made to separate the renal artery and renal vein. The enormous cavity which will remain will be packed lightly with gauze and a cigarette drain inserted to the stump, the muscles closed in the usual way, and the skin closed with silk.



Fig. 374.—Pelvis opened to show the position of the stones.

Examination of the specimen shows an enormous kidney that measures 12 by 7 inches. The surface is very irregular and shows the presence of many large saccules, and in the pelvis of the kidney can be felt many hard stones. This specimen we will not open, but it will be immediately placed in formalin. After the specimen has been barded it will be opened (Figs. 373, 374).

Stones having their origin in the kidney may have one of the following four terminations

- 1 The stone may remain in the kidney in one of the calices or in the pelvis

- 2 The stone may enter the ureter and in its course down the ureter become lodged therein. This usually occurs or occurs with predilection at one of the normal constrictions of the ureter

- 3 The stone may pass from the ureter into the bladder where it may remain and become the nucleus for a bladder stone. If a careful history is elicited in cases of vesical calculus one is often able in a certain percentage to obtain a history of a previous attack of renal colic. This may have occurred many years ago so that the patient has quite forgotten it unless his attention is specifically called to the fact

- 4 The stone may be voided by the patient

Kidney and ureteral calculi often present many symptoms in common so that at first one is not able to make an absolute differentiation between them. This point must often be settled by the roentgenogram and in cases in which this is negative one may resort to other diagnostic measures

The present high plane which has been attained in the surgical treatment of renal calculi is a more or less direct outgrowth of the accurate methods of diagnosis that are at our command. Briefly they are

- 1 The roentgen ray

- 2 The cystoscope and ureteral catheter

- 3 The shadowgraph catheter and pyelography

- 4 The functional kidney tests

Undoubtedly the single factor which has contributed most to the diagnosis of kidney and ureteral calculi is the x ray. Its field of usefulness in this work is further enriched by the simultaneous employment of the x ray and the cystoscope made possible by the introduction of the shadowgraph catheter and pyelography

While it may be possible in a large number of cases to make a diagnosis by means of the roentgen ray alone, there will al

ways remain a certain number of cases in which pyelography, the shadowgraph catheter, or both, must be employed. Thus, for example, in cases of stone occurring in a pelvic kidney no positive diagnosis can be made without the employment of one or both of these additional aids.

Not only is the roentgen ray of value in the diagnosis of calculi, but it is of inestimable value in watching the progress of a calculus down the ureter. Another example in which a combination of methods is of value is illustrated in cases in which a stone in the renal pelvis or ureter does not show very plainly in the roentgenogram. If one injects into the pelvis or ureter a solution of collargol, and takes a second picture, the stone then appears very distinctly on the plate. This, as far as I know, was first recommended by Kümmell, of Hamburg.

Nor should we forget in applying the roentgen ray that the exposure should include both kidneys and both ureters. The value of this procedure is apparent when we bear in mind the frequency of bilateral calculi, as well as the possibility of the presence of a stone in one kidney and the occurrence of one or more stones in the ureter of the same or opposite sides. The value of this procedure is also apparent in cases in which a nephrectomy was performed for stone, and the patient then returns with a stone in the remaining kidney. It is of more than academic interest under such circumstances to know whether the stone was present before the first operation, or has formed subsequently.

Cystoscopy and Ureteral Catheterization.—Whereas these two diagnostic aids cannot establish a positive diagnosis in each and every case of renal or ureteral calculus, they can in a definite number of cases give us information from which a diagnosis may be made or ventured. By their employment it is possible in nearly all the cases to locate the source of the pathologic elements found in the urine, such as blood or pus, if they are present. In cases of renal stone associated with profuse hemorrhage, the origin of the blood may be determined in this way. In cases of descending ureteral stone associated with colic one may often see changes about the ureteral orifice of the

corresponding side. In passing, one may also mention the use of the wax tipped catheter. If positive information is obtained in this way one may venture the diagnosis of stone, if the result of this examination is negative, it does not exclude stone.

Functional Tests—After the diagnosis of stone has been made and the treatment outlined, we are next concerned with the condition of and the presence of the opposite kidney. This important point deserves due consideration in each and every case no matter how simple the operative treatment may seem. Not infrequently a simple operation is contemplated, but complications arise which end in the removal of the kidney. If the presence of the opposite kidney has been determined and its functional capacity been determined it is a very comforting thing in those instances in which one is obliged to remove the kidney.

Of the various functional tests that have been advised the one most frequently used is the phenolsulphonephthalein test which has answered my purposes very well. There are many objections and many objectors to a too careful reliance and dependence upon dye tests. I believe that one should not rely upon the result of the dye test alone but that one should include careful examination of the urine both chemically and bacteriologically.

Indications for operation

1 Cases in which there is a vital indication to operate. Under this one may consider cases of anuria, acute pyelonephritis, profuse hemorrhage, and conditions of retention which sooner or later lead to atrophy of the kidney.

2 Cases in which the operation must be advised but in which there is no immediate danger as regards the life of the patient or the function of the kidney. In this group belong the cases associated with chronic pyelitis, repeated attacks of colic without the passage of stone, pain or discomfort in the kidney area, and the presence of stone in the ureter.

3 Cases in which intervention is unnecessary. In this group one may consider cases that can be treated medically. Briefly, these are cases with repeated attacks of colic associated

with the passage of small stones, in which the urine is not infected and in which the x-ray does not show large stones.

The three operative procedures in the surgical removal of kidney stone are: pyelotomy, nephrotomy, and nephrectomy.

Pyelotomy, in cases suitable for it, is a simple and safe procedure involving little or no hemorrhage, and it has the great advantage over other operations that it avoids a mutilation of kidney tissue, which always occurs to a certain extent when a nephrotomy is carried out. Pyelotomy, furthermore, avoids or prevents the occurrence of hemorrhage from the kidney into the renal pelvis, which oftentimes results in the bladder becoming distended with large blood-clots, so that the patient suffers a great deal of pain and one has a lot of trouble in freeing the bladder of these clots. The essentials for success in pyelotomy are:

1. In selecting cases for pyelotomy we should be guided by the results of the roentgen ray examination and possibly by the pyelographic findings.
2. Limiting its use to pelvic stones.
3. Employing pyelotomy in cases in which there is no infection present, or infection of mild degree.
4. One should be able to deliver the kidney.
5. Avoiding unnecessary trauma to the pelvis.
6. Prevention of injury to the blood-supply of the kidney pelvis.

Before incising the pelvis the peripelvic fat should be carefully separated. Occasionally an accessory pelvic vessel may be present, and unless this is recognized and avoided the patient may have a certain amount of hemorrhage. Great care should be used in performing pyelotomy not to tear the renal pelvis, not only because of the danger of hemorrhage but also because large and irregular tears of the renal pelvis have been followed by persistent sinus formation. Because of the more or less limited field of operation it is particularly desirable before closing the incision in the pelvis to be sure that the stone removed is intact and that no fragments have been left behind.

Nephrolithotomy.—In cases in which the stone is too large

to be removed through the pyelotomy incision, or where the stone or stones extend into the calices branching in various directions, in instances where the pedicle is very short and where there is a good deal of perirenal inflammation so that the kidney cannot be delivered into the wound, one must resort to nephrolithotomy. There are instances in which one starts out to do a pyelotomy, which, judging from the roentgenogram would be the correct procedure, but one or several of the above-mentioned conditions are found so that nephrolithotomy is the only course open. At times it may even happen that one must remove a calculus with the kidney remaining *in situ*.

After the kidney has been delivered into the wound it should be carefully palpated for the presence of stone. That is the stone should be definitely located before cutting into the kidney. This may not always be possible in the cases of very small calculi, yet when possible it should be done. Palpation of the renal pelvis can be carried out at the same time.

In cases where the stone is seen in the x ray, but cannot be felt some surgeons are in the habit of needling the kidney. This procedure is advised by some and condemned by many chiefly for the reason that if a hard nodule is felt and if it be a calculus it must be cut down upon anyway. If nothing is felt by needling no one would be satisfied with the limited information obtained in this way so that exploration must be resorted to anyway.

If the calculus can be felt in the substance of the kidney it should be exposed by an incision either on the convex border of the kidney or if the stone is near the anterior or posterior surface of the kidney it may be cut upon directly.

The nephrotomy incision is usually made in the convex border a little nearer the posterior portion of the convexity than the anterior as there is less danger of injuring the vessels. After the incision has been made the interior may be examined with the finger or the calculus may be directly removed with the aid of the forceps. The stone must be carefully examined to ascertain whether or not it is complete, whether or not facets are present so that calculi may not be overlooked.

The further treatment of the nephrotomy wound will depend upon several factors, chief of which is the presence or absence of infection. When infection is present it is often advisable to insert a tube for drainage, although this procedure has been criticized because of the hemorrhage which it may produce.

Hemorrhage is one of the more important complications following nephrotomy, and has often proved so serious that a secondary nephrectomy became necessary in order to save the life of the patient. When the hemorrhage occurs at the time of nephrotomy it can usually be controlled. This may be done by grasping the pedicle in order that one may make an inspection of the field. Occasionally a spurting artery is seen that can be caught with the forceps. Often, when the hemorrhage seems to be due to a general oozing, it may be controlled by hot pads. As a rule, the sutures which close a nephrotomy incision suffice to control the bleeding.

The bleeding that makes one feel absolutely helpless is the continued postoperative hemorrhage. As previously mentioned, the bleeding continues, the hemoglobin goes down steadily, the patient's mucous membranes become pale, and one must resort to nephrectomy in order to save the life of the patient. Under these circumstances one always feels more comfortable if the status of the kidney which remains has been definitely determined before operation.

URETERAL CALCULUS: REMOVAL BY INTRA-URETERAL INJECTIONS OF OIL

Summary Differential interpretation of x-ray plates; evolution of the treatment for ureteral calculus, conservatism the keynote of present-day methods, demonstration of 2 cases.

ONE of the most satisfactory diseases of the urinary tract the surgeon is called upon to treat is ureteral calculus. This present satisfactory treatment is due to several factors, the chief of which are our ability to accurately diagnose this condition, and the large number of cases that can be treated without resorting to the open operation. The early work in this field was seriously handicapped by frequent misinterpretation of the roentgen-ray findings. Many patients with severe abdominal pain were examined by the roentgen ray, a shadow or multiple shadows were seen that were erroneously interpreted as being due to ureteral calculi, and the patients were operated upon and no stones found. Later, with the introduction of the shadowgraph catheter, it was shown that many of these bodies were situated outside of the ureter; that is, when these patients were x-rayed with the shadowgraph catheter in the ureter it was seen that the catheter passed at some distance from the so-called stone. In this plate (Fig. 375) it can be seen that the catheter passes at some distance from the shadow. By this simple procedure we can definitely state that the shadow is of extra-ureteral origin, and hence cannot be due to a stone in the ureter. These shadows may be produced by various conditions and are not always due to the same cause. Among the more frequent causes of obscure shadows in the pelvis may be mentioned calcification of the ligaments, calcified lymph-nodes, plaques in the arteries and veins, phleboliths, and areas of calcification in the seminal vesicles or broad ligaments. In some instances these shadows have been produced by pills that were ingested by the patient,

be borne in mind when considering surgical treatment. Formerly all those patients in whom a diagnosis of ureteral calculi was made were operated upon. Now as is well known they are not operated unless other measures fail.

The treatment of ureteral calculi in a general way has passed through three stages. The first stage may be represented by the period immediately after the introduction of the roentgen rays.



Fig. 377.—Note position of stone. It will be seen by comparing with Figure 376 that the stone has been turned around on its long axis.

At this time many now well recognized extra ureteral shadow producing bodies were erroneously diagnosed as calculi and the patients unnecessarily operated upon. The second stage may be represented by the period immediately following the introduction of the shadowgraph catheter by means of which more accurate diagnoses were made and the number of unnecessary operations was very greatly reduced. The general consensus of

opinion during this time was that the treatment of ureteral calculi was surgical, and the operation usually employed was the extraperitoneal ureterotomy. The third period may be represented by our present-day views, and is characterized by the swing of the pendulum in the opposite direction, so that at the present time the keynote in treatment is conservatism. *In other words, one resorts to operation only after a prolonged, careful, and conscientious use of non-operative measures fails to accomplish removal of the stone.*

As an example of what can be accomplished by the non-operative treatment I wish to present the following cases. The first has been relieved of the stone by oil injections and the second is still under treatment.

CASE I. Miss C. G., aged twenty-four, complains of pain in the sacral region and in the lumbar region, pain in the right side of the abdomen, nausea, and vomiting. The patient dates the onset of her present complaints back one and one-half years, previous to which time she felt perfectly well. During the night she had sudden, severe, sharp pain in the right lumbar region, radiating toward the right inguinal region. The pain lasted for an entire day and part of the next night and gradually disappeared. During the attack of pain she had reflex nausea and vomiting, and there were associated chills and fever, but there was no jaundice or hematuria. The pain was so severe in character that she received a hypodermic injection.

She had a second attack three months later similar in all its essentials to the first attack. In all she had about ten attacks, the last one occurring ten days ago.

General physical examination was negative. Roentgen-ray examination showed the presence of a stone low down in the pelvis. The stone has an L shape, and from the history and from the roentgen-ray plate a diagnosis of stone in the right ureter was made by Dr. Bevan, to whose service the patient was admitted at the Presbyterian Hospital. Dr. Bevan referred her to me for treatment before considering surgical intervention.

Cystoscopic Examination. February 13, 1917: Right ureteral orifice appears edematous, the edema being in front of the

ureteral opening The ureteral orifice was slit on the upper surface by means of the operating cystoscope and a ureteral catheter passed as far up as possible and 10 c c of sterile oil injected through the catheter

February 15, 1917 Attempt made to catheterize right ureter Catheter meets an obstruction about 5 cm behind stone. Injection of 10 c c. of oil

February 23, 1917 Right ureter catheterized Catheter passed up into the pelvis and 10 c c of sterile oil injected

March 8 1917 Another injection of oil Attempt was made at this time to grasp the stone with forceps, but failed

March 16, 1917 Catheterization of right ureter and injection of 10 c c of sterile oil

March 18, 1917 The patient passed a large stone

During these injections of oil the roentgen ray pictures that I show you were taken In one picture the stone is completely turned around, which can be seen by looking at the accompanying plates A well known fact was brought out in this case, namely, that with a case of ureteral stone one does not expect to find an obstruction to the passage of the catheter In this case for example, about one-half the time the catheter would lodge in the ureter or better, perhaps, was obstructed in its passage up the ureter by the stone while at other times the catheter was passed without difficulty

CASE II Mr F G, referred by Dr McCulloch, was first seen by Dr McCulloch on the 5th of May About 1 o'clock that day he began to have pain on the left side, which was dull at first and later colicky in type This pain radiated along the course of the ureter and down into the scrotum The pain was dull in character and at no time was severe enough to have an anodyne At 6 P M he had a severe chill and his temperature began to rise The alternating periods of chills, fever, and perspiration continued for forty-eight hours and he was taken to the hospital During this time the output of urine was scanty, only 600 c c in twenty four hours

Previous History—Fourteen years ago he had an attack of ptomain poisoning and ever since he has had these attacks at

varying intervals. In 1906 he saw Dr. Frank Billings. At that time there was no stone in the urinary tract and a diagnosis of pyelitis was made. In 1907 he again had a severe attack lasting six weeks, during which time he had several attacks of hiccup, one of which lasted for four days. Seven years ago he passed a stone.



Fig. 378 —Stone in ureter before intra-ureteral injection of sterile olive oil.

Examination shows a middle-aged man, well nourished and with good color, who is apparently suffering considerable pain. The pupils are equal and react to light and accommodation. Teeth are fair. Heart normal, tones clear and regular. Lungs negative. There is considerable tenderness over the region of

the left kidney and ureter. Blood pressure is 135 systolic and 90 diastolic.

Blood count shows 28 000 whites. Temperature is 103° F. Urine examination Turbid, albumin present, also red blood cells and pus.

Roentgen ray examination. This shows the presence of a shadow compatible with that of a stone in the ureter situated at the level of the fourth lumbar vertebra (Fig. 378).

From the history, physical findings and x-ray findings a diagnosis of stone in the ureter was made and it was decided to treat the patient by injections of oil into the ureter.

May 7 1917. Cystoscopic. Patient was cystoscoped with the operating cystoscope. The left ureteral orifice is normal except that it appears to be very small. The operating scissors were introduced into the ureter and the mouth of the ureter slit. The catheter was passed until the obstruction by the stone was met, 20 c c of sterile oil were injected.

Since his first treatment the patient has had a rather stormy time. He became very toxic, had a chill of twenty minutes' duration, a temperature of 103° F. and at times was somewhat irrational. The hiccup continued for several days so that no instrumentation was carried out until the 21st.

A roentgen ray taken May 19 1917, or twelve days after his first treatment, showed the calculus to have wandered down the ureter so that now it rested at the level of the second sacral foramen (Fig. 379).

May 21 1917. 15 c c sterile oil injected into the pelvis of the left kidney. This time the catheter passed all the way up the ureter into the kidney pelvis again demonstrating that a good sized stone may be present in the ureter without producing any obstruction.

A third roentgen ray picture shows the stone 1 inch farther down the ureter.

May 23 1917. The patient was given another injection of 30 c c of sterile oil.

The technic of these procedures consists in the use of intravesical manipulations with the cystoscope. These procedures

briefly considered, are: first, dilatation of the ureteral orifice either with a catheter or with a ureteral dilator in order to stretch the ureteral orifice so that the stone may be allowed to pass. Where this fails, and sufficient dilatation cannot be obtained, the ureteral orifice may be enlarged by slitting it with



Fig. 379 —Showing position of the stone after the first injection of oil.

the scissors. In cases where the stone is smaller and situated high above the bladder in the ureter we may try to dislodge the stone by the ureteral catheter. This may be followed by intra-ureteral injections of a local anesthetic followed by the injection of oil. To aid in dilating the ureter, injections into it of a solution of papaverin has been advised.

In view of the fact that a large number of stones are passed spontaneously patients should first be given medical management this to consist of the drinking of large quantities of water moderate catharsis and general hygienic treatment. If this fails then one is justified in advising the use of the ureteral catheter. If many repeated attempts by this means fail to relieve the patient then and only then is one justified in operating. In other words operative treatment should be the last resort. I cannot tell you off hand the number of cases of stones that we have had in our clinic that have been treated in this way but I should say that the percentage that we operate upon is not over 4 or 5 whereas formerly they were all operated upon. It is surprising how large a stone can be removed in this way by simply slitting the ureter passing up a large catheter to dilate the ureter and then injecting oil.

In conclusion therefore I believe that one is justified in making many attempts to remove the stone by means of ureteral catheterization the operating cystoscope and injections of oil etc. and then only after repeated attempts have failed is one justified in performing a ureterolithotomy. While ureterolithotomy if carried out by means of extraperitoneal dissection is relatively an easy procedure and has practically no mortality still every once in a while a patient following ureterolithotomy develops ureteral stricture infection destruction of the kidney, and death.

CLINIC OF DR. THOMAS J. WATKINS

ST. LUKE'S HOSPITAL

CYSTOCELE, UTERINE PROLAPSE, RETROFLEXION, AND RECTOCELE REPAIRED BY PLASTIC OPERATION UPON BROAD LIGAMENTS AND VAGINA; FIXATION OF THE ROUND LIGAMENTS AND ADVANCEMENT OF THE ANTERIOR VAGINAL WALL; PERINEORRHAPHY

Summary: History of patient illustrating many of the late symptoms and signs incident to the traumatism of labor; relation of the symptoms to the physical signs; method of procedure for correction of the pathologic changes—technic in detail.

HISTORY

MRS. L., aged thirty-seven, married eleven years, weight 149 pounds.

Family History.—Negative.

Past Illnesses.—Always well except for some attacks of nervous exhaustion.

Present Illness.—Dates from birth of child nine years ago, which was a difficult labor. Her symptoms have been distress on walking and standing, the distress consisting in a feeling of weight in the pelvis, backache, and general fatigue. She also has much mental depression. The distress is more marked upon the left side of the pelvis than the right, probably due to varicose veins in the broad ligament.

Menstruations are normal, except for some increased amount of flow. Vaginal discharge slight.

Vesical Symptoms.—Partial incontinence of urine.

Bowels.—Constipated.

Physical Examination.—General condition of patient excellent.

Pelvic Examination—Perineum is much relaxed. There is a pronounced rectocele. The urethra is displaced downward and has an increased amount of mobility. It can be pressed upward about $\frac{1}{2}$ inch, which represents the amount of urethrocele. There is considerable bulging of the bladder wall into the vaginal canal (cystocele). The cervix is $1\frac{1}{2}$ inches from the vaginal orifice, which in this case indicates a prolapse of the uterus, as the cervix is about the normal length. The cervix is lacerated bilaterally, but not deeply, and this is of no special pathologic importance. The uterus is in retroposition. The body of the uterus is easily palpated in the posterior vaginal fornix. Bimanual palpation shows the uterus displaced backward and one and one half to twice its normal size. Both ovaries are palpable, normal in size and freely movable. The free mobility indicates that there has been no salpingitis, as in a case of salpingitis the ovaries are almost invariably fixed by adhesions. The uterus is easily replaced.

PATHOLOGY

The pathology in this case is entirely the result of the traumatism of labor. There is no history or sign of infection. The levator ani muscle has been considerably attenuated and separated from its attachment to the pubic ramus, thus allowing the perineum to drop downward and backward. This has increased the separation of the levator muscles near the median line and a hernia of the rectum has resulted (rectocele). The urethra was crowded downward in front of the child's head and some of its points of attachment were torn and stretched, and it has never recovered its normal location and position. The fascia in the vesicovaginal septum was torn and overstretched and has resulted in a hernial opening through which a portion of the bladder protrudes (cystocele). The injuries to the pelvic floor allowed the uterus to sag in the pelvis and in sagging the cervix followed the vaginal canal and as a result, the uterus in passing around the "uterovaginal angle" tipped over backward into the position of retrodisplacement. The increased size of the uterus is the result of the prolapse and retroflexion. This has

obstructed the venous circulation, and as a result the uterus has become engorged with venous blood, edematous, and hyperplastic.

RELATION OF SYMPTOMS TO PATHOLOGY

The distress on walking and standing can be attributed to two causes: First, the varicosity of the pelvic veins, which is often very marked in such cases as this one; and second, the sprain of the pelvic supports, chiefly of the uterine ligaments. Manipulation of the uterus shows the ligaments to be hypersensitive. This can be proved by traction upon the cervix or upward pressure upon the cervix. Palpation of the uterosacral ligaments shows them to be hypersensitive. The backache is probably the result of the sprained uterine ligaments and partly the result of general fatigue due to the pelvic disturbances. The control of the urine is somewhat impaired by the displaced urethra.

The treatment proposed is operative. Non-operative measures would only give a moderate amount of temporary relief. The principle of the operation proposed is to restore the position of the uterus by vaginal fixation of the round ligaments and by shortening a portion of the broad ligaments, and by tipping the body of the uterus forward so that the cervix will be displaced upward and backward. The hernial opening of the cystocele will be closed partly with the round ligaments and partly with the excised portion of the broad ligaments and by "circular sutures," to be described later. The urethra will be restored and fixed to its normal location by vaginal attachment of the round ligaments and by "circular sutures." The rectocele will be repaired by perineorrhaphy: operative procedures which do not endanger future pregnancies or labors.

OPERATIVE TECHNIC

The buttocks and vaginal canal are freely painted with one-half strength tincture of iodine. As soon as this is dried it is removed with alcohol. A speculum is inserted and the cervix drawn down with bullet forceps to ensure complete disinfection

of the vaginal canal. Otherwise some folds of the mucous membrane are almost certain to be slipped which might seriously impair healing.

The cervix is dilated with Hegar sounds which are dipped in iodine. The cervix dilates easily and the uterus is $\frac{1}{2}$ to 1 inch

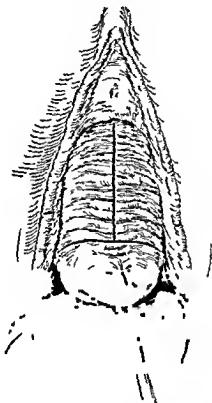


Fig. 380.—Lines of incision to be made during the progress of the operation.

increased in depth. The curet shows a normal mucosa; the thickness of the mucosa corresponds to the menstrual cycle.

Figure 380 shows the lines of incision to be made during the progress of the operation. A transverse incision is now made anterior to the cervix extending freely from one side to the other (Fig. 380). It is important that this be a long incision so as to permit the uterus to tilt freely upon its axis as the opera-

tion progresses (Fig. 381, 1). The cut edge of the vaginal wall is grasped on either side and the vagina is separated from the bladder by blunt dissection with a Mayo scissors, as shown in Fig. 381, 1. Care is exercised that this dissection be made along the plane of the fascia which separates the vagina from the bladder. With a little care and experience this is easily accomplished. The blunt dissection extends down to the base of the urethra. The vaginal flap is now incised in the median line to the urethra, and the hypertrophied mucosa, which is nearly always present over the body of the urethra, is excised. If this is left, it is sure to protrude and annoy the patient. Lateral separation of the flaps is now made to the desired extent, which should completely free the herniated portion of the bladder, but should not injure the ureters or the large veins.

Separation of the Bladder from the Cervix.—The plane of fascia which separates the bladder from the cervix is detected with a small amount of care, and the blunt dissection here also is done with Mayo scissors, care being taken that the point of the scissors is continually directed toward the cervix away from the bladder, as depicted in Fig. 381, 2. This dissection is continued until the tissue over the uterus is freely movable on palpation with the finger, which means that the fascia which unites the bladder to the cervix has been completely separated and that the peritoneum alone moves between the finger and the uterus. The width of this separation is made sufficient to allow the body of the uterus to be easily tilted into the vagina. The base of the broad ligament is clamped on either side with 8-inch forceps and the portion of the broad ligament between the forceps and the cervix is incised, as illustrated in Fig. 381, 3. This also shows the bladder elevated with a retractor, and completely separated from the cervix except by its peritoneal attachment. These forceps are left on to facilitate the plastic work upon the broad ligaments which will be done later.

Incision of the Peritoneum and Exposure of Round Ligaments.—The bladder is elevated with retractors and the peritoneum is exposed. The peritoneum is grasped with tissue forceps and readily incised. Figure 381, 4 shows the peritoneum

of the vaginal canal. Otherwise some folds of the mucous membrane are almost certain to be skipped, which might seriously impair healing.

The cervix is dilated with Hegar sounds, which are dipped in iodin. The cervix dilates easily and the uterus is $\frac{1}{2}$ to 1 inch

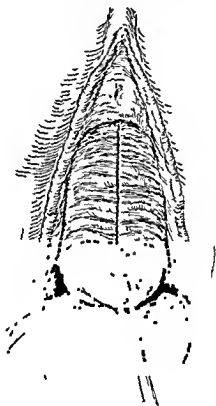


Fig. 380—Lines of incision to be made during the progress of the operation

increased in depth. The curet shows a normal mucosa, the thickness of the mucosa corresponds to the menstrual cycle.

Figure 380 shows the lines of incision to be made during the progress of the operation. A transverse incision is now made anterior to the cervix, extending freely from one side to the other (Fig. 380). It is important that this be a long incision so as to permit the uterus to tilt freely upon its axis as the opera-

incised and a portion of the peritoneal surface of the uterus exposed. The opening is stretched with the fingers. The body of the uterus is now grasped with bullet forceps successively at points higher and higher until the fundus is reached. Now the uterus is readily delivered into the vaginal canal, as illustrated in Fig. 382, 5. Palpation and inspection show the ovaries and tubes normal. The round ligament is now found and grasped about $1\frac{1}{2}$ inches from its attachment to the uterus and is held with Allis forceps. The same is done with the other round ligament. The body of the uterus is now replaced in the abdominal cavity (Fig. 382, 6).

Fixation of the Round Ligaments.—How this is done is important, as it materially determines the result. Care is taken that each suture is placed at a point which will permit the loop of the ligament to be brought to the vagina without too much tension. The distance this point is from the uterine attachments will vary in individual cases. It should be such as to put the entire round ligament on about the same amount of tension. It should be fixed as low down in the vaginal incision as possible without excessive tension. Excessive tension means increased postoperative pain, with a possible stretching of the line of union. The fixation should be made firmly to the submucous connective tissue, and should be placed so that when the sutures are tied the urethra will be drawn upward to a place of relative fixation. This is certain to correct the urethrocele and to restore completely the control of urine. The fixation is made with fine linen or silk. Any hypertrophied mucosa present over the body of the urethra is now excised and sutures inserted as shown in Fig. 382, 6 and 7.

Insertion of the Circular Sutures.—The remaining redundant tissue in the vaginal flaps is now excised. The amount excised should allow easy coaptation without undue tension. The repair is made over the body of the urethra with fine catgut. The first

Fig. 381 —1, Separation of bladder from vaginal wall. 2, Dissection which frees bladder from cervix. 3, Broad ligaments incised and bladder well retracted preliminary to going through peritoneum. 4, Peritoneum opened and anterior surface of uterus exposed

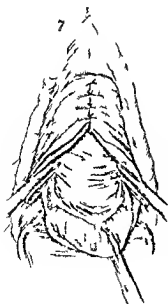
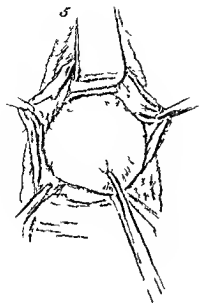


Fig 382—5 Body of uterus drawn through incision so that round ligaments may be grasped 6 Uterus replaced in abdomen and round ligaments held by forceps 7 and 8 Steps in closure of incision uterus included in first step

circular suture passes through the vaginal wall near the base of the urethra and passes through the body of the uterus about $\frac{1}{4}$ inch above the reflection of peritoneum, and out on the opposite side through the corresponding portion of the other vaginal flap (Fig. 382, 8). This should include completely the submucous connective tissue. When this is tied, the hernial

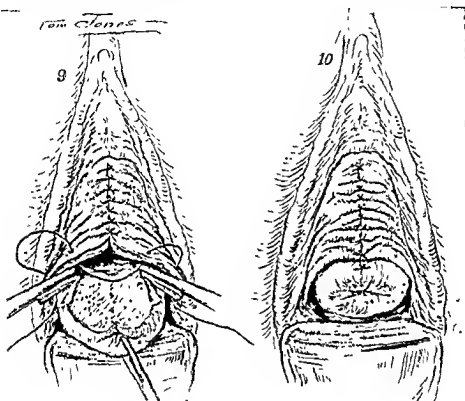


Fig. 383 —9 and 10, Steps in closure of incision; suture of vaginal flaps and V-shaped opening in cervix

opening of the bladder is entirely closed. This should also be placed so that undue tension will be avoided and the urethra will be held in normal location. A second circular suture parallels the first one, about $\frac{1}{4}$ inch distant from it. The rest of the vaginal wound is now closed with No. 1 catgut, each suture passing through the anterior wall of the cervix. The anterior lip is excised by a V-shaped incision, as illustrated in Fig. 383, 9.

Figure 383 9 also shows the method of suture used to unite the cut ends of the broad ligaments together in front of the cervix. In cases of extensive displacement the broad ligaments should be sutured separately with buried fine linen or silk.

Inspection now shows the urethra relatively fixed and a convexity at the site of the cystocele the cervix well tilted upward and backward and the vaginal canal about $3\frac{1}{2}$ inches long (Fig 383, 10)

The operation is completed by a perineorrhaphy the technic of which was described in a previous clinic.

RADIUM IN HEMORRHAGE AT THE MENOPAUSE

Summary: Two cases of hemorrhage at the menopause treated with radium; how radium produces results; technic of application of radium—the limits of safety—disturbances following its use.

THIS patient is interesting, as the condition which she presents is quite common and can be treated with great certainty of cure by the use of radium.

Mrs. F. J. U., aged fifty, consulted me in June, 1910, relative to excessive menstruations and pelvic distress. She had retroversion of the uterus, which was about one and a half times normal size. The perineum was lacerated. She was operated on by me in June, 1910. The uterus was cureted, anterior vaginal fixation was made, and perineorrhaphy performed. The results were satisfactory except that the increased menstruations have persisted.

On March 20, 1917, she consulted me again for the excessive menstruations. She was bleeding more than half the time, and the loss of blood had reduced the hemoglobin to about 40 per cent. The uterus had remained enlarged and was one and a half to twice larger than normal. The ovaries and tubes were apparently normal.

On March 31, 1917, she was given nitrous oxid anesthesia and the uterus was explored and cureted, showing an apparently normal endometrium; 50 mg. of radium were inserted into the uterine cavity. The radium was screened with 1 mm. of gold, covered by rubber. It was left in for twenty-four hours. Microscopic examination of the scrapings showed no malignant change. She experienced slight nausea for about forty-eight hours, with very little vomiting, and apparently had some exhaustion for a few days as a result of the radium. She flowed moderately for about one week after the radium was used.

On April 12 1917 examination showed the uterus somewhat lessened in size no recurrences of the bleeding and her general condition considerably improved

On April 19 1917 she had a very slight menstrual discharge

June 16 1917 There has been no more bleeding The uterus is well atrophied and her general condition is excellent

The diagnosis in the above case is hemorrhage of the menopause the pathology of which has not been definitely determined The opinion is becoming somewhat general that these hemorrhages are due to disturbances of the secretion of the ductless gland due to menopause changes This means that less importance is attributed to the senile changes in the vessels which occur at the menopause than was formerly the custom This case is presented because it is a typical case of hemorrhage at the menopause with the usual result of radium treatment

Action of Radium —In this case the effective action of radium was probably due to destruction of the graafian follicles that is the ova were destroyed The radium also produced definite changes in the endometrium and in the blood vessels of the uterus The radium lessens very much the amount of epithelial tissue and increases the amount of connective tissue It causes the epithelium to be replaced by connective tissue cells It also obliterates small blood vessels

Technic of Application —An anesthetic is necessary as the screening makes the capsule so large that it is difficult or impossible otherwise to insert it into the uterus The radium element is in a small glass capsule This is enclosed in a small silver capsule and this is placed inside of a gold capsule which is covered by rubber to which a strong silk cord is attached to guard against losing the radium It is sterilized by immersion in carbolie acid and alcohol and dipped in tincture of iodin before being inserted into the uterus The usual aseptic care is exercised to prevent infection The uterus is curetted for diagnostic purposes Small polyp and hypertrophied tissue may be found with the curet and removed with benefit

Dosage Limits of Safety —Sufficient experience has been obtained to make it very safe to use radium under certain re-

strictions. With the screen given above there is apparently no danger of burning the inside of the uterus with 50 mg. left in for twenty-four hours, that is, with 1200 mg. hours. Experience has shown that 1000 to 1500 mg. hours inside of the uterus produce little disturbance with proper screening.

Systemic Effects.—It is rather difficult to determine how much these are, as symptoms often follow the procedures which are employed in conjunction with radium, namely, the pre-operative use of morphin and the gas anesthesia. Nausea and vomiting are undoubtedly occasional results, and it is quite common to have some feeling of exhaustion for two or three days following the application. These symptoms probably depend very largely upon the amount of diseased tissue which is present and which rapidly undergoes degenerative changes. There is no pain from the use of radium more than would result from dilatation and curetage. The nausea and vomiting can possibly be somewhat lessened by the free use of alkalies before, during, and after the application. We are in the habit of giving 20 to 30 grains of bicarbonate of soda four times daily during that time. Bleeding for a few days not uncommonly follows the use of radium, and leukorrheal discharges are increased for two or three weeks. One menstrual period occasionally occurs after the use of radium. In a case like this one would feel quite certain that not more than one period would result. In such a case as this reports have shown that it is occasionally necessary to make a second application. It is well to wait for the result as regards the second menstrual period before deciding upon subsequent application. In the light of experience it is fair to conclude that some of these second applications would have been unnecessary if the patient had been kept under observation longer before subjecting her to additional treatment.

The value of radium in this case is very great to the patient, as without its use excision of the uterus would have been indicated in order to ensure a cure. Careful statistics show that thousands of cases of hemorrhage at the menopause have been so severe and persistent that hysterectomies have finally been performed.

The following case is especially interesting in this connection:

Mrs. H., aged forty-seven, suffered from *excessive* menstruations. The uterus was considerably enlarged, but apparently contained no neoplasms. She had chronic nephritis, chronic myocarditis, and a blood-pressure of 230 systolic and 120 diastolic. The amount of hemorrhage and the enlarged uterus would indicate hysterectomy if her general condition would tolerate such an operation—1200 mg. hours of radium were used, as in the other patient, with the hope that it might give relief, but with the fear that the high blood-pressure together with the heart and kidney lesions might cause failure.

It is now six months since the radium was applied and the bleeding has been entirely stopped.

I hope at a future time to give short talks on the use of radium in cases of vaginitis, endocervicitis, small fibroids in the latter part of the reproductive period, and uterine cancer.

CLINIC OF DR. DANIEL N. EISENDRATH

COOK COUNTY HOSPITAL

THE COMPLICATIONS OF APPENDICITIS

Summary: Patient operated on four weeks before for gangrenous appendicitis with perforation near tip and abscess formation. Uneventful convalescence for first five days after operation, then severe chill followed by fever and sweat. Recurrence of chills and fever at irregular intervals accompanied by icterus and evidences of sepsis. Diagnosis of pyephlebitis due to extension of infection from veins of appendix region into radicles of portal vein within liver. Consideration of most frequent complications which may follow acute appendicitis.

I DESIRE to present today a case which illustrates the necessity of keeping in mind the fact that cases of appendicitis which do not present any unusual features at the time of operation may develop most serious complications after operation. For this reason one can never be too guarded when asked as to the prognosis of a case of acute appendicitis.

This patient, a man of forty, was operated upon four weeks ago during my absence by one of my colleagues. He found a gangrenous appendix, with a perforation near the tip, surrounded by an abscess containing a small amount of pus. The onset and finding upon admission were most typical, and the attack was the first one, so far as could be ascertained.

During the first five days following the removal of the appendix and drainage of the abscess cavity the convalescence was uneventful. Suddenly, on the evening of the sixth day, without any prodromal symptoms, the patient had a slight chill and his temperature rose to nearly 104° F. On the following day he appeared apathetic, but he had no chill, although his fever rose to 102° F. On the eighth day after operation—*i. e.*, forty-eight hours after his first slight chill—he had a severe chill and his

temperature again rose to 104° F The accompanying chart (Fig 384) shows the course of the fever and the frequent recurrence of the chills during the interval since the severe chill at the end of the first week following the operation up to the present time, three weeks later—i e, four weeks after the operation

The chills and fever have been accompanied by marked evidences of a generalized infection within the vascular system The

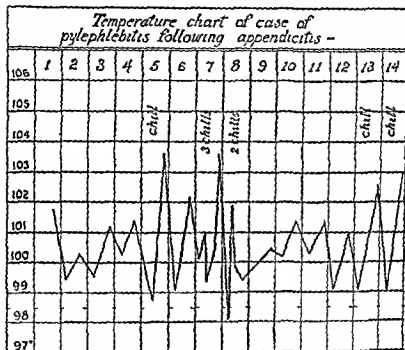


Fig 384—Temperature chart from case described in lecture Note slight postoperative rise for first five days then recurrent chills and high fever until death four weeks after operation

skin and visible mucous membranes have become more and more icteric the pulse is very rapid and compressible and the sensorium more dull every day so that he appears extremely ill today

Since the appearance of the first symptoms of a generalized infection every effort has been made to determine the cause of the chills and fever and especially to ascertain whether a definite focus could be found and, by establishing drainage assist the

patient to combat the infection which has already spread so widely within his vascular system.

The complications of acute appendicitis may be classified as follows:

1. Acute gastric dilatation.
2. Generalized peritonitis.
3. Formation of abscesses adjacent to the appendix.
4. Intestinal obstruction:
 - (a) Immediately after operation (duplex ileus).
 - (b) Paralytic or adynamic ileus.
 - (c) Late ileus from bands, kinks, etc.
5. Subphrenic abscess with or without an accompanying serous or purulent pleuritic effusion.
6. Empyema (right or left sided) without an accompanying subphrenic abscess.
7. Pylephlebitis (infection extending from the veins of the appendix into the intrahepatic radicles of the portal vein).
8. Hemiplegia due to embolism of one of the cerebral vessels.
9. Phlegmonous infiltration of the abdominal wall in the vicinity of the incision.
10. Thrombophlebitis of the veins of the lower extremities.
11. Acidosis.
12. Pyelonephritis.

Let us consider these complications in detail, and attempt to make a diagnosis of the complication in this case by exclusion.

1. *Acute Gastric Dilatation*.—Either as a complication of a generalized peritonitis or independently of such an extensive infection of the peritoneal cavity, paresis of the musculature of the stomach may occur, and unless recognized early and treated by repeated gastric lavage, may cause death by interference with the action of the heart and lungs through upward pressure upon the diaphragm (Fig. 385). Such a complication is not infrequent after the majority of abdominal operations, but is most likely to take place within the first thirty-six to seventy-two hours after an operation for acute appendicitis or gall-bladder disease.

The clinical pictures presented by this much-dreaded complication are:

(a) Symptoms of interference with the cardiac and respiratory organs in the form of cyanosis, marked dyspnea, cold sweat, and rapid, weak pulse. The only local findings in this class of cases (in which vomiting such as characterizes the other clinical variety

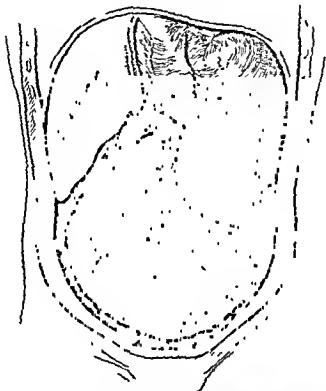


Fig. 385.—Autopsy view of an acutely dilated stomach complicating an operation for acute appendicitis

plays a minor part) is a marked distention of the upper abdomen and a tympanitic note over the heart. In this form the diagnosis of acute gastric dilatation is very difficult to make unless such a possibility is constantly borne in mind whenever the convalescence from an abdominal operation is not as uneventful as one expects. If there is the least doubt in your mind about the existence of such

a condition after an operation, the passage of a stomach-tube and the evacuation of large quantities of brownish, sour fluid, followed by immediate cessation of all of the above symptoms, will clear up the diagnosis.

(b) The more frequent clinical picture of postoperative acute gastric dilatation is where vomiting without effort of large quantities of brownish, sour liquid is accompanied by all of the above symptoms (cyanosis, dyspnea, cold sweat, rapid pulse, and extreme prostration). The passage of a stomach-tube and thorough gastric lavage, the patient being placed on his side so as to avoid aspiration into the lungs, will be followed by immediate relief of symptoms, which if allowed to continue would result unquestionably in a fatal outcome. I cannot emphasize too strongly the necessity of keeping such a complication constantly in mind after an operation for acute appendicitis such as our patient has had. The absence of any of the symptoms I have just mentioned enables us at once to exclude this complication.

2. *Generalized Peritonitis*.—The abdomen of this patient, although distended, is soft and not tender to palpation. The absence of vomiting, the fact that there are no signs of intestinal obstruction, and the relatively slow pulse in the intervals between the chills would at once exclude a generalized peritoneal infection.

3. *Localized Intra-abdominal Abscess*.—The absence of any localized rigidity or tenderness and the fact that the fever is intermittent and not of the continuous type, as one would expect if there were an abscess close to the appendix, and exploration of the wound for such a focus with negative results excludes this complication. The most frequent form of localized suppuration which can give rise to fever after operation is an abscess located in the true pelvis. In such cases muscular rigidity and tenderness may be of minimal degree, and only rectal or vaginal palpation enable one to make a diagnosis. At times, for a number of weeks after drainage of a generalized peritonitis, abscesses may become walled off in any portion of the abdominal cavity and give rise to persistent fever, but chills are never present.

4 *Intestinal Obstruction*—(a) The paralytic or adynamic ileus which may follow an operation for acute appendicitis does not differ in any respect from that which may complicate all abdominal operations. The enormous abdominal distention, inability to obtain the passage of flatus and the vomiting are due to paresis of the intestinal musculature and respond readily in many cases to small doses of pituitrin. (b) By ileus duplex



Fig 386—A form of intestinal obstruction which may complicate acute appendicitis when appendix (A) lies in true pelvis and coils of terminal ileum become agglutinated and lie in pus. In these cases the abdominal distention, vomiting and inability to pass feces or flatus is not relieved by the removal of the appendix and drainage of the abscess (see text)

(Fig 386) I refer to a form of intestinal obstruction in which the coils of the last—i.e. terminal—portion of the ileum have become agglutinated in the true pelvis and linking of the afferent upon the efferent loops of ileum results with obstruction of the fecal current. In many cases especially in children where the appendix lies in the true pelvis one is often surprised to find symptoms of intestinal obstruction on the third or fourth day after

removal of the appendix and drainage of a pelvic abscess unless the occurrence of this form of ileus is borne in mind.

(c) Late ileus may be due to the persistence of the kinks just referred to, but is more often caused by bands of inflamma-

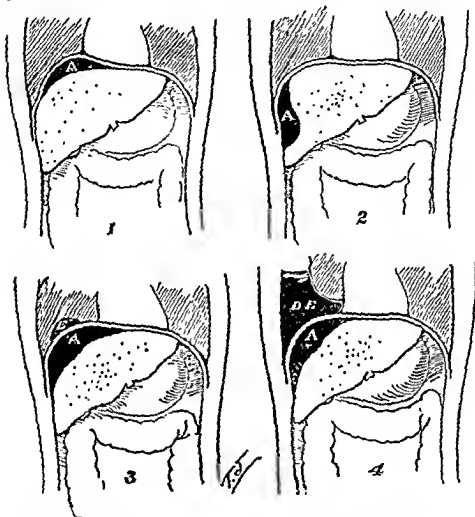


Fig. 387.—Most frequent varieties of right-sided subphrenic abscess. 1, Abscess (A) beneath dome of diaphragm. 2, Abscess (A) beneath dome of diaphragm and right lobe of liver. 3, Large subphrenic abscess (A) and right-sided empyema (E) lying between right lung and diaphragm. 4, Large subphrenic abscess (A) complicated by a diffuse empyema (D, E).

tory origin tightly constricting some coil close to the original seat of trouble. The symptoms are those characteristic of ileus in general. In our patient, although there is abdominal distention,

there are none of the other symptoms of intestinal obstruction, such as vomiting and the inability to secure the passage of flatus or feces. We can thus exclude ileus of any form as the cause of the postoperative complication in this patient.

5. *Subphrenic Abscess*—By this we mean a more or less extensive collection of pus in the space between the right lobe of the liver and the diaphragm on the right side, or between the left lobe of the liver, stomach, spleen, and diaphragm on the left side. The right-sided subphrenic abscesses are, as a rule,

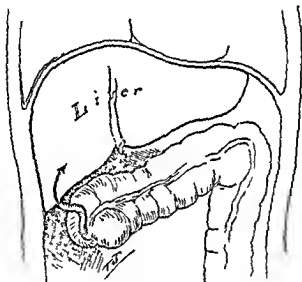


Fig. 388.—Arrow indicates route taken by infection toward subphrenic space in a case of non rotation of the cecum.

due to extension of infection from the appendix, from the gall-bladder, or as the result of the perforation of a duodenal ulcer. Left-sided subphrenic abscesses usually follow perforation of a gastric ulcer, especially of the lesser curvature or the posterior wall. A left-sided abscess after appendicitis is quite rare, although I have reported such a case.

The abscess may occupy only a relatively small space under the dome of the diaphragm, or between the side of the right lobe of the liver and the diaphragm (Fig. 387). It is surprising to find

how small an amount of pus in a subphrenic abscess can give rise to a most grave clinical picture following an operation for appendicitis. The abscess is usually intraperitoneal, but may occasionally lie entirely extraperitoneal. It may follow the removal of the appendix even when there has been no visible pus formation. It is very rarely seen as a localization of pus in a generalized peritonitis.

The extension of infection from an appendix attached to a cecum which has not rotated (Fig 388) and lies just below the liver, is readily understood. How such an infection extends from an appendix attached to a fully rotated cecum and spreads to the subphrenic space is best explained by assuming that the infection travels along the inner or outer "gutter" (Fig. 389) of the ascending colon. The frequent occurrence of subphrenic abscess in cases of retrocecal appendicitis is readily explained in this manner. The lymphatics undoubtedly play an important part in this extension of infection to the subphrenic space.

At times, as we shall presently see, the intrahepatic branches of the portal vein or the lymphatics draining the appendix region are the seat of an extensive infection which may spread to the liver tissue and result in the formation of a solitary or of multiple abscesses, which by continuity extend into the subphrenic space. Involvement of the pleural cavity with the formation of a serous or purulent exudate is a not infrequent complication of subphrenic abscesses.

Rupture into the lung, although rare, reveals itself clinically by the expectoration of large quantities of pus, usually with a very fetid odor.

As a rule, pus alone is found, but the additional presence of gas occurs often enough to explain some of the peculiar x-ray findings to be referred to later.

The most important data upon which to base a diagnosis of subphrenic abscess after an operation for appendicitis such as this patient has had are (a) the history, (b) the physical examination, (c) the x-ray examination, and (d) the results of exploratory puncture.

The history of apparent recovery followed by the persistence

of or the sudden appearance of fever after an operation for appendicitis should always cause one to search for a subphrenic abscess. Chills are never present unless the focus is secondary to an intrahepatic infection, as I have just explained

Physical examination reveals little unless the abscess lies close to the costophrenic sinus or has displaced the liver downward.

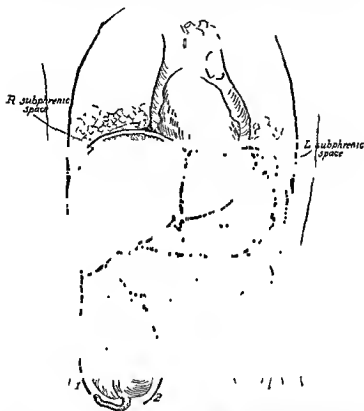


Fig 389 —Topographic relations of the organs of upper abdomen to those of thorax. Arrows indicate how infection travels along outer or inner edge of ascending colon from appendix to subphrenic space

Normally, as you will recall from your course in physical diagnosis, the upper border of the liver dullness during expiration is at the sixth rib in the mammary line, at the eighth rib in the mid-axillary line, and at the tenth rib in the scapular line (Fig 390). During inspiration the lung descends into the costophrenic sinus,

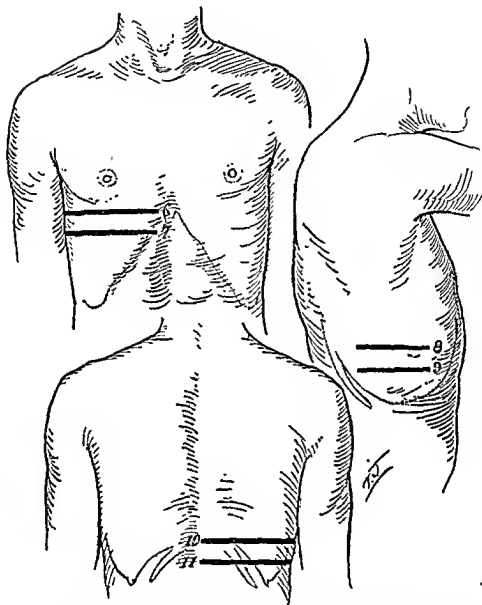


Fig. 390.—Anterior, posterior, and lateral views of thorax showing normal range of respiratory mobility of lower border of lung in the costophrenic sinus. The absence of a change in percussion-note at these levels (see text) upon deep inspiration is a very valuable sign in subphrenic abscess.

so that the upper border of liver dulness lies at the seventh, ninth, and eleventh ribs respectively. A convenient way to remember these important data are by the figures 6-8-10 and 7-9-11.

Now I have seen a comparatively large number of cases of subphrenic abscess, and whenever the respiratory excursion of the lung fills this space completely and there is no area of dulness, with a *convex upper border* (Fig 391), I feel that the physical examination at least is of no aid in the diagnosis

A coexistent pleuritic effusion will, of course, cause the upper border of the dulness to extend much farther up than in a subphrenic abscess alone, and cause this upper border to be horizontal (Fig 391 2) instead of convex (Fig 391, 1)

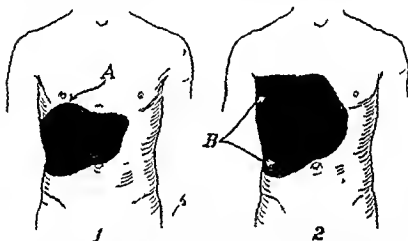


Fig 391—1 Normal liver dulness with abnormal area of dulness due to subphrenic abscess (A) Note convex upper border of latter 2 Area of dulness when a subphrenic abscess is complicated by a diffuse empyema Note how the normal liver dulness is undistinguishable from that due to the subphrenic abscess and empyema (B)

Roentgenoscopic examination with the patient in an upright position if possible and the use of stereoscopic x ray plates have become the two most accurate methods of diagnosis of this complication of appendicitis We can at once determine whether the right or left half of the diaphragm possesses its normal contour and range of mobility When a diffuse or encapsulated pleural effusion is present on the right side the liver shadow merges directly into that due to the fluid in the pleural cavity (Fig 391) If such an effusion is absent, the diaphragm shows a more or less

circumscribed elevated shadow¹ due to the collection of pus in the subphrenic space, so that an exact localization of the extent and position of the subphrenic abscess is possible by roentgenoscopy alone, and confirmed by the taking of stereoscopic plates.

Exploratory puncture should only be undertaken when one is prepared to operate immediately after the employment of this method. The entire subphrenic space itself must be explored in a systematic manner from the median line in front to the spine behind. One may at first find clear fluid and then pus if the needle has passed through a serous effusion in the pleural cavity first and then through the diaphragm into the subphrenic abscess. I recall one of my cases of subphrenic abscess in which the needle was inserted eight times before pus was found. Since the introduction of roentgenoscopy, exploratory puncture is seldom employed in our larger hospitals.

We have employed roentgenoscopy three times since the chills and fever have appeared in this patient, with negative results. Examination of the respiratory mobility and upper and lower borders of liver dulness also show no changes from the normal relations. Finally, we have made a systematic examination with an exploratory (Record) syringe of the right subphrenic space and only found a few shreds of a fibrinous character, which evidently had their origin within the liver, but have found no pus. These examinations repeated at frequent intervals during the past three weeks justify the conclusion that a subphrenic abscess and an empyema can be excluded.

6. *Empyema*.—This is a rather infrequent complication of appendicitis, but it may be present independently of a subphrenic abscess. Like the latter, it is not characterized by symptoms such as pain or tenderness or prominence, which might be of service in calling attention to the presence of a complication. Whenever fever persists or recurs after an operation for acute appendicitis, the first complications you must think of are (a) abscesses which escaped detection at operation or have formed since that time, (b) subphrenic abscesses, and (c) empyema. The

¹ If gas is present in addition to pus, a clear area represents the space occupied by the gas.

absence of the well-known physical signs of empyema and the negative x-ray examination enable me to exclude empyema as the cause of the serious clinical picture which the patient presents today.

Hemiplegia, Phlegmon of the Abdominal Wall, Acidosis, Femoral Phlebitis, and Pyelonephritis.—Hemiplegia, as the result of the transport of an embolus from the appendix region to the brain, is a rather rare complication, but I have observed such a case. Infection of the abdominal wall may prove to be a very serious factor in the prognosis of a case of suppurative appendicitis in which insufficient drainage¹ has been established. The pyogenic organisms multiply very rapidly in the loose areolar tissue between the muscles forming the abdominal wall as well as in the subcutaneous fat. I have observed a fatal outcome in 2 cases following an operation for acute appendicitis with generalized peritonitis. Examination of this patient's wound fails to show any retention of pus, so that this complication may also be eliminated from further consideration. The same is true of acidosis because this complication presents itself under one of a number of different clinical pictures. In the majority of my own cases of postoperative acidosis a persistent hiccup, accompanied by vomiting and the presence of acetone and diacetic acid in the urine, has comprised the most frequent syndrome. In children I have observed a number of cases in which delirium, restlessness, high temperature, and rapid pulse have been the chief symptoms of the acidosis.

Pyelonephritis, usually of hematogenous origin, is characterized clinically by the frequent recurrence at irregular intervals of chills and fever. As a rule, only one kidney is involved and the organ is enlarged and tender. The urinary findings are insignificant in comparison with the severity of the clinical picture. The presence of frequently recurring chills and fever in our patient is suggestive of such a complication, but the absence of any localizing symptoms referable to either kidney

¹ The peritoneum is much more resistant to infection than the tissues of the abdominal wall, and I have observed some extremely severe gangrenous phlegmonous invasions of the abdominal wall, especially after a generalized peritonitis.

rather speaks against a pyelonephritis as the cause of the septic condition in this case.

Thrombophlebitis of the femoral or popliteal vein may occur on the right or on the left side, and is characterized by pain, swelling, and a whitish, tense edema of the skin.

Pylephlebitis.—By this is understood an infection of the terminal branches of the portal vein within the liver. The infection usually travels by way of the veins of the mesentery of the appendix into the veins which pass upward between the folds of the ascending mesocolon to form the right colic vein, and from here the thrombophlebitis extends into the superior mesenteric vein and then to the portal vein itself (Fig. 392). The predominance of irregularly recurring chills and fever in the clinical picture and the absence of any localizing signs stand out as the most striking clinical features of this much-dreaded complication of acute appendicitis. Let us stop for a moment and consider the salient points up to the present time in this case, and see if our diagnosis of pylephlebitis is justified.

Male, aged thirty-nine, enters hospital February 26, 1917, with pain in right lower quadrant of abdomen, nausea, and vomiting. Had been sick for three days. Upon admission, tenderness and a mass the size of a lemon in right lower quadrant.

White blood-count, 12,200. Appendectomy on day of admission for gangrenous retrocecal appendix, with perforation and abscess near tip. On March 3d drain removed; profuse wound discharge. Two days later first slight chill and fever, and again, four days later, a very severe chill and high fever. Since March 12th frequent chills, followed by fever at irregular intervals, accompanied by gradually increasing evidences of systemic infection (icterus, etc.). Repeated examinations (physical diagnosis, x-ray, and exploratory puncture), all negative. Same true of wound and even of rectal examination.

Now when we consider that we have excluded all of the other complications, there remains but one which will best explain the clinical picture presented by this patient.

All of his symptoms are those of a very severe form of infection within the vascular system. The recurrence of the chills

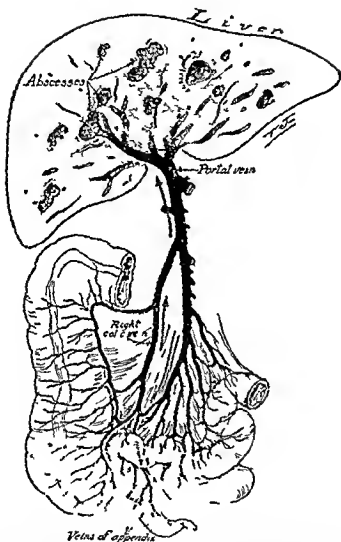


Fig. 392.—Suppurative pyelphlebitis due to extension of infection from appendix as in case referred to in text. Note how the veins of the appendix empty by way of the right colon and superior mesenteric veins into the portal vein and from there to its innumerable radicles causing multiple intrahepatic foci and later generalized intravascular infection.

and fever at irregular intervals, marked prostration, dry tongue and skin, icterus, rapid pulse, and lethargy are all the result of a

severe sepsis, and are best explained by the assumption that the infection has spread rapidly during the past four weeks from the blood-vessels of the appendix region by way of the intra-hepatic veins into the systemic circulation. In other words, a localized appendiceal thrombophlebitis has by extension caused a similar condition within the liver (pyelephlebitis) and, indirectly,



Fig. 393.—Subhepatic abscess complicating gangrenous appendicitis in an appendix attached to a non-rotated cecum. This occurred in one of my cases in a boy of fifteen, causing symptoms of an acute infection in the right upper quadrant.

a generalized bacteriemia. Whenever repeated chills and fever follow an operation for acute appendicitis one of the first conditions you must think of is the complication which will unquestionably result fatally here.¹

¹ The septic condition of the patient became progressively worse, and he died about five weeks after the original operation. Consent to hold an autopsy was not obtained.

TWO CASES ILLUSTRATING THE CLINICAL IMPORTANCE OF CONGENITAL ANOMALIES OF THE KIDNEY

Summary: Case 1.—Hydronephrosis of the lower half of a double kidney having two ureters and two pelvises; nephrectomy; ideal points in the diagnosis of double kidney; treatment.

Case 2.—Pyelonephritis of double kidney, predominating in the lower half; nephrectomy.

I DESIRE to show you today a patient from whom the left kidney has been removed for an infected hydronephrosis of the lower half of a double kidney. The patient is a woman, forty-seven years of age, whose chief complaint upon admission four weeks ago was a severe pain in the left upper quadrant of the abdomen. The pain had been present in a severe form for a week before coming to the hospital. Prior to this increase in the severity of the pain she stated that she had noticed a pain of a less severe character for some months from which she had been unable to obtain relief. The pain was always accompanied by vomiting, which latter symptom had been especially prominent during the period of more acute exacerbation. There was increased frequency of urination.

The previous and family history were negative. Examination upon admission showed marked rigidity and tenderness in the left upper quadrant of the abdomen, which extended to the left into the ilio-costal space. Owing to the high temperature and extremely septic condition of the patient when first seen by me cystoscopy and ureteral catheterization were deemed inadvisable. A roentgenogram of the urinary tract failed to show any abnormal shadows. The shadow of the right kidney could be distinctly seen, but that of the left was indefinite. The urine contained a moderately large amount of pus.

A diagnosis of left-sided pyonephrosis was made and drainage as a temporary measure of relief seemed indicated. Four weeks

ago an incision was made, extending from the angle of junction of the last left rib with the erector spinæ obliquely downward to a point about 1 inch above the anterior superior spine of the ilium. After division of the abdominal muscles the perirenal fat was exposed and found to be very edematous, as is so often the case in the vicinity of an infected kidney. Upon separating the perirenal fat a large, tensely filled sac was exposed, which at the time of this first operation was thought to be the entire kidney converted into a sac containing pus. This was incised and a quart of thick pus evacuated. Examination of the interior of this sac showed that we had opened an infected hydronephrosis, only a narrow zone of kidney parenchyma remaining intact. On account of the septic condition of the patient removal of the kidney at this time was deemed inadvisable.

The patient improved greatly after this drainage and the temperature returned to normal for about three weeks. For the past week, owing to the difficulty of maintaining the drainage, her fever has recurred and she has become quite septic again, necessitating a second operation.

During the interval between her first and second operations I catheterized the ureters and found a single ureteral opening on each side. The urine escaped immediately after introduction of the catheter from the right ureter and the examination of this urine and of the functional capacity of the right kidney revealed a normal functioning organ. From the left ureter we obtained a very turbid urine containing many pus corpuscles, but the functional test showed considerable activity on this side which we were at a loss to interpret, because, at the first operation, very little kidney tissue had been found.

At the second operation yesterday, we removed a large sac, which at first was thought to be the entire kidney converted into a hydronephrotic sac. After separation of this sac from its bed of firm adhesions the existence of an upper normal half, almost completely separated from the pathologic lower half became apparent. Owing to the presence of so many old adhesions it was impossible to separate the two halves, and a complete nephrectomy was done.

The specimen is that of a kidney having two uterers and pelves. The upper half is of normal appearance and consistency. It is about two-thirds the size of the adult kidney (Fig. 394, 1), and has a ureter which enters on its mesial aspect close to the constriction which represents the line of separation between this upper normal half and the lower hydronephrotic sac. The ureter of this upper half passes in a tortuous manner along the posterior surface of the lower hydronephrotic half. The two ureters joined at about the level of the true bony pelvis, thus accounting for the occurrence of a single ureteral opening, as found at the time of the cystoscopic examination. The ureter of the lower half entered the sac close to the line of constriction between the two halves (Fig. 394, 2). The kidney when opened shows a perfectly normal upper half (Fig. 394, 2), with the exception that there is an absence of parenchyma at the lower pole. The lower half of the double kidney is represented by a hydronephrotic sac with only a narrow rim of parenchyma. At the point of origin of the ureter, near the upper end of the sac, is a valve-like fold of mucous membrane which was an important factor in obstructing the escape of urine from the lower half (Fig. 394, 3).

The anomalous faulty origin of the ureter, from the upper pole of the lower renal pelvis and the valve at the outlet of the pelvis, were the direct cause of the hydronephrosis. Infection of the stagnant urine occurred and the clinical picture detailed to you resulted. The case is of importance in many respects. It shows that anomalies of the kidney are no longer a subject of interest to the pathologist alone, but the fact that they are especially liable to certain pathologic changes (hydronephrosis or the formation of calculi) makes them assume great importance from a clinical standpoint. The ideal points in the diagnosis of these cases of double kidney are: (a) the discovery of more than a single ureteral orifice on one or both sides of the bladder, (b) the passage of shadowgraph catheters into both ureters, and (c) a pyelogram showing two separate ureters¹ and renal pelves (Fig. 395). Although the occurrence of double kidney is men-

¹ The finding of two separate meati on one side does not necessarily indicate the existence of separate pelves, since the two ureters may unite above the bladder.



Fig. 394 —Posterior aspect of double kidney having two pelvises and two ureters. Hydronephrosis of lower half of kidney due to faulty or gain of the ureter (2) with valve formation. 1 Upper half of kidney. 2 Opening of ureter of lower half. 3 Ureter of upper half passing across back of hydronephrotic lower half.

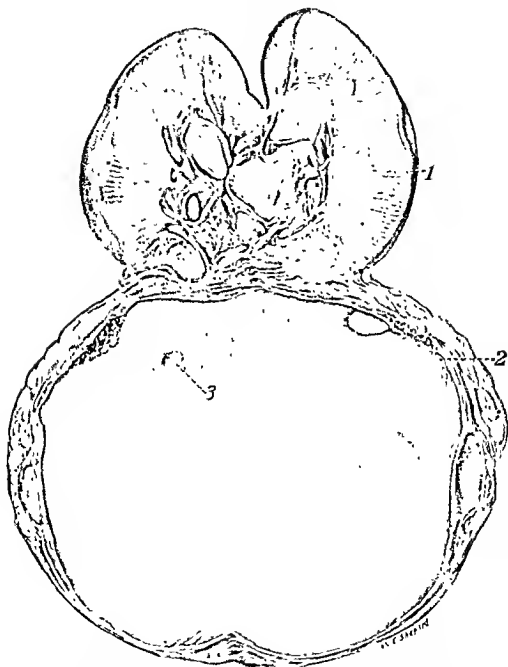


Fig. 395.—View of relations of lower hydronephrotic half of the author's case of double kidney to the upper normal half 1, Upper perfectly normal half with its pelvis (for course of ureter, see Fig. 394) 2, Interior of hydronephrotic lower half. 3, Valve obstructing opening of ureter (with anomalous origin) of the lower half.

tioned in a number of treatises on surgery of the kidney there are relatively few references to the clinical importance of these anomalies. Israel¹ describes a case quite analogous to my own of an infected hydronephrosis in the upper half of a double kidney also due to an anomalous origin of the ureter. In 5 cases reported by Braasch² the various pathologic conditions affecting

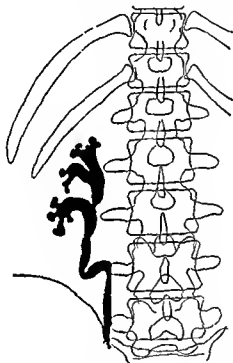


Fig. 396.—Pyelogram of a kidney having two separate pelves and a joint ureter (Braasch)

the half of a double kidney and necessitating operation were 2 cases of hydronephrosis resulting from anomalous blood vessels constricting the ureter near its entrance into the renal pelvis 2 cases of hydronephrosis resulting from stricture at the wall of the bladder and 1 case of hydronephrosis and stone.

I have been able to find a case similar to my own in an old

¹ Nierenchirurgie (Monograph published in 1903)

² Annals of Surgery November 1912 p. 727

German inaugural thesis, showing the origin of the ureter from the ventral side of the upper end of the lower half of the kidney

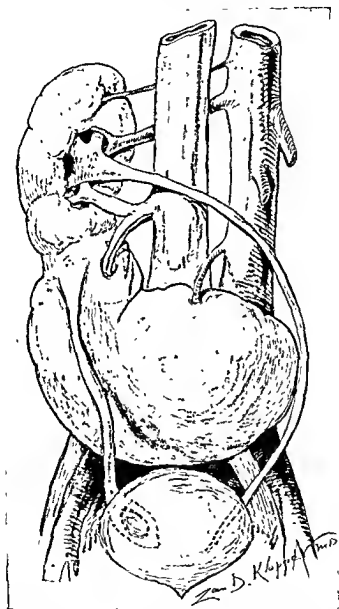


Fig. 397 —Hydronephrosis of lower half of a solitary completely fused kidney. The ureter of the lower half of the solitary kidney was obstructed by a calculus resulting in hydronephrosis (from a German inaugural thesis)

with resultant hydronephrosis (Fig. 397). The ideal method of treatment of these cases of double kidney would be resection of

the diseased half and W J Mayo¹ was able to do so in 3 cases
In many cases of double kidney however there is such a fusion



Fig. 398 —Pyelonephritis in lower pole of a kidney having two separate pelvis and two ureters but no separation of the parenchyma

of the parenchyma of the two halves that separation is impossible as shown in the second case of double kidney which I
Quoted by Braasch (*et de supra*)

shall show you and which required removal on account of recurrent attacks of sepsis.

CASE 2.—This patient is a woman, twenty-five years of age, who was first admitted six weeks ago on account of severe pain over the left kidney, radiating downward along the course of the ureter. Her temperature, localized tenderness and rigidity, urinary and cystoscopic findings all indicated an infection of the left kidney. There was a single ureteral orifice on each side of the bladder, and röntgenograms showed a renal shadow on each side of normal size and location. After three weeks of non-operative treatment she left the hospital, but with the recurrence of the same symptoms she re-entered. Operation was decided upon, the left kidney exposed, and considerable inflammatory edema of the tissues around the lower pole found. The kidney showed a number of miliary abscesses scattered over the surface, but at the lower pole these were present in very large numbers.

During the separation of the kidney from its bed the presence of two ureters was noted, but owing to the absence of any line of separation between the two halves the entire kidney was removed. When opened the cut surface (Fig. 398) shows the lower pole studded with a large number of miliary abscesses probably of ascending lymphogenous¹ origin. There are two renal pelves and two ureters, but the parenchyma of the two halves are completely fused, showing that resection of the pathologic half would have been impossible. This case is another example of the clinical importance of anomalies of the kidney.

¹ See recent publications of the author on the subject of Ascending Infections of the Kidneys, *Jour. Med. Research*, 1917, xxxv, p. 295; *Journal Amer. Med. Assoc.*, 1917, lxxviii, p. 540.

CLINIC OF DR. HUGH McKENNA

ST. JOSEPH'S HOSPITAL

A CASE OF PERFORATED DUODENAL ULCER

Summary: Hematogenous origin of many gastro-intestinal lesions—gastric and duodenal ulcers and appendicitis; outstanding points in the diagnosis of duodenal ulcer; recognition and management of ruptured ulcer; intractable hemorrhage, failure of adequate medical management, marked cicatricial narrowing and perforation the chief indications for surgical interference.

I WISH this morning to present briefly a review of the subject of duodenal ulcer with the report of a case recently operated on for rupture of an ulcer.

Since the publication by Mr. Traveis of a report of his first case of duodenal ulcer in the *London Medico-Chirurgical Transactions* of 1817, vol. viii, p. 232 (Moynihan), much discussion has arisen over the pathology, diagnosis, and treatment of stomach diseases. The splendid investigations of E. C. Rosenow has done much to lay a scientific foundation for our conceptions of the etiology of gastric and duodenal ulcer. Because of the frequency of these diseases in medical practice, this discussion is devoted particularly to them.

Etiology.—Any one who has followed the experiments of Rosenow, and especially one who has had a fair observation in the surgery of the stomach, must come to the conclusion that ulcers have a definite relation to focal infections, such as those occurring about the mouth, ears, sinuses, etc. That they are hematogenous infections, occurring in the same manner that inflammation is set up in the appendix, I think there is no question. A very striking example of the relation of focal infection to appendicitis occurred in one of our surgical residents at the hospital during the past year, Dr. M., whose history I shall

give briefly This case is cited because I believe that it explains the relationship between the infected tonsil and the appendix and that infections of the tonsil bear the same relationship to ulcers of the duodenum

One week previous to his attack of appendicitis the patient was taken down with an acute streptococcal tonsillitis The bacteriologic examinations were made by Dr G F Dick under whose care the patient was at this time Convalescence progressed satisfactorily for one week at which time the patient developed typical symptoms of acute appendicitis for which condition I operated upon the patient under novocain anesthesia owing to the presence of the throat infection The operation was at 8 o'clock in the evening The assistant pathologist made smears and cultures directly from the mucosa of the appendix in the operating room Examination of these cultures at 8 o'clock the following morning showed a most interesting condition A very extensive growth covering all but a thin line in the center of the blood agar slant which upon microscopic examination showed the colon organisms The growth over the thin line in the center of the tube so narrow that just a fine platinum needle could be inserted between the rapidly enveloping growth of the colon colonies was examined and found to be the same hemolytic type of streptococcus that had been isolated from the tonsils one week previously The patient made an uneventful recovery

I have removed gastric ulcers and perigastric glands in which upon section in paraffin bacteria were demonstrated by staining reaction

Diagnosis --The subject of diagnosis has been so thoroughly worked out that there is little to say respecting gastric and duodenal ulcer Suffice it to mention that I depend more upon the history and the roentgen screen findings than anything else The history when carefully taken in duodenal ulcer is so typical with respect to periodicity the attacks occurring usually in the autumn and spring pre meal pain particularly at midnight and vomiting at the same midnight hour if at all coupled with rapid gastric peristalsis as demonstrated with the

x-ray screen, that not much doubt need be felt concerning the diagnosis. The finding of blood in the stomach contents or in the feces will depend upon the time of examination and the age of the ulcer. The importance of diagnosis is shown in the fairly large percentage of complications arising from unrecognized and untreated cases of ulcer.

Surgical Treatment.—There still remains a great difference of opinion between internists and surgeons respecting the proper method of treating ulcer, especially duodenal ulcer.

There seems to be no question but that all cases of ulcer of the pylorus and duodenum with constriction should be handled surgically, and that a no-loop posterior gastro-enterostomy should be made with or without excision of the ulcer, depending upon its location. In all cases in which the ulcer is not removed the scar should be covered by means of a purse-string suture or flap of omentum.

It is needless to say that immediate surgical treatment is imperative in the cases of rupture of the ulcer. Within the past few months I saw in consultation with two other physicians a case with the following history:

The patient, a lawyer, thirty-three years of age, was taken suddenly ill while seated in his chair in his office, the pain in the abdomen being so severe that he fell practically unconscious to the floor. Two physicians in the adjoining building were called. They made a diagnosis of gangrenous appendicitis with rupture. An ambulance was called and the patient was sent to the hospital, but owing to the delay of the ambulance he did not arrive there until about two hours after the onset of the pain.

Upon examination of the patient I found an individual in a semicomatose condition, very anemic looking, and suffering excruciating pain, especially upon pressure, in the upper abdomen. There was some rigidity of the right side of the abdomen, but no blood in the vomitus, nor had there been any history of blood in the vomitus. The history of so-called dyspepsia and a similar attack one year previously was given. Blood examination showed a leukocytosis of 14,000. Upon the history, which was quickly taken, I made a diagnosis of ruptured ulcer of the duodenum.

pute is still raging. I would be inclined to advise that, in addition to the above, all ulcers which show a tendency to repeated hemorrhages in spite of careful medical management, and those which resist a reasonable trial of accurate, well-controlled medical treatment, should be accorded surgical therapy. All simple ulcers may be clinically cured without operation, and it is advisable to refer such cases to competent internists.

x-ray screen, that not much doubt need be felt concerning the diagnosis. The finding of blood in the stomach contents or in the feces will depend upon the time of examination and the age of the ulcer. The importance of diagnosis is shown in the fairly large percentage of complications arising from unrecognized and untreated cases of ulcer.

Surgical Treatment.—There still remains a great difference of opinion between internists and surgeons respecting the proper method of treating ulcer, especially duodenal ulcer.

There seems to be no question but that all cases of ulcer of the pylorus and duodenum with constriction should be handled surgically, and that a no-loop posterior gastro-enterostomy should be made with or without excision of the ulcer, depending upon its location. In all cases in which the ulcer is not removed the scar should be covered by means of a purse-string suture or flap of omentum.

It is needless to say that immediate surgical treatment is imperative in the cases of rupture of the ulcer. Within the past few months I saw in consultation with two other physicians a case with the following history:

The patient, a lawyer, thirty-three years of age, was taken suddenly ill while seated in his chair in his office, the pain in the abdomen being so severe that he fell practically unconscious to the floor. Two physicians in the adjoining building were called. They made a diagnosis of gangrenous appendicitis with rupture. An ambulance was called and the patient was sent to the hospital, but owing to the delay of the ambulance he did not arrive there until about two hours after the onset of the pain.

Upon examination of the patient I found an individual in a semicomatose condition, very anemic looking, and suffering excruciating pain, especially upon pressure, in the upper abdomen. There was some rigidity of the right side of the abdomen, but no blood in the vomitus, nor had there been any history of blood in the vomitus. The history of so-called dyspepsia and a similar attack one year previously was given. Blood examination showed a leukocytosis of 14,000. Upon the history, which was quickly taken, I made a diagnosis of ruptured ulcer of the duodenum.

The patient was a bad risk because of a bad heart condition and it was necessary to operate upon him rapidly. An incision was made at the right rectus border high enough to expose the stomach and at the same time low enough to permit examination of the appendix. Upon opening the abdomen the appendix was readily exposed and found to be very large and acutely inflamed. Both the attending men were then assured that his condition was one of acute appendicitis but it was apparent that the pathology in the appendix was not sufficient to account for the symptoms that were present. Upon placing a laparotomy pad in position and lifting up the abdominal wall the anterior portion of the first segment of the duodenum came plainly into view showing the scar of an old ulcer with a small rupture the size of a 22 caliber rifle bullet in it and the contents of the stomach pouring out into the free peritoneal cavity. Owing to the very bad condition of the patient it was decided not to attempt a posterior gastroenterostomy the usual method of treatment for these cases but to be content with simple closure of the ulcer and drainage.

The outcome of this case was so favorable both with respect to the immediate and after treatment and to the subsequent history of the patient that I think it worth while to present the operative details even though they are not new by means of the accompanying plates. Figure 399 shows the position of the ulcer with the Lembert mattress sutures in place closing the ulcer in such a manner as to increase the lumen of the duodenum which I feel is very important in these cases. Figure 400 shows the method of using the pedicled flap of omentum to cover these sutures and to guard against recurrence of the perforation. A drain was placed in the abdomen which remained for a matter of four or five days and was removed. The patient started taking nourishment by mouth on the fifth day and made an uneventful recovery.

Upon these two points there is no difference of opinion. First that ulcers with cicatricial narrowing of the lumen of pylorus or duodenum sufficient to produce definite obstruction with symptoms should be treated by operation and second



Fig. 399 (upper) and Fig. 400 (lower) —Illustrating method of closing perforation and protecting closure by omental flap

that perforated ulcers demand surgical intervention. With regard to the management of the other types of ulcer the dis-

pute is still raging I would be inclined to advise that, in addition to the above, all ulcers which show a tendency to repeated hemorrhages in spite of careful medical management, and those which resist a reasonable trial of accurate well controlled medical treatment, should be accorded surgical therapy All simple ulcers may be clinically cured without operation and it is advisable to refer such cases to competent internists

THE EARLY RECOGNITION AND TREATMENT OF ACUTE APPENDICITIS

Summary: Necessity for a renewal of the campaign of education in the early diagnosis of acute appendicitis; pain, nausea and vomiting, fever, and leukocytosis the cardinal symptoms of appendicitis; cases without nausea and vomiting—reasons for their occurrence; differential diagnosis—ruptured tubal pregnancy; acute gall-bladder disease; acute pancreatitis; renal and ureteral calculus.

BEFORE operating this morning I wish to discuss briefly the acute surgical lesions of the abdomen with special reference to the recognition and treatment of appendicitis. I have called your attention to the subject of appendicitis from the fact that I believe this subject must be brought more forcefully before the profession than it has been during the last ten or fifteen years. In large hospitals one sees many neglected cases of acute appendicitis in spite of the fact that we of late have fancied that every medical man was able to recognize this lesion at its very inception. This, however, is not the rule, and it has been my experience that many doctors are not able to give the symptoms of appendicitis in the order that is characteristic of their appearance, and that enables one to make a differential diagnosis at a time when that diagnosis means proper surgical treatment.

During the past few weeks I have had occasion to operate upon the following cases, a brief history of which I will give, which enables you to see the stage at which many of them are brought to the surgeon.

CASE I.—Dr. B., a dentist, thirty-eight years of age, weighing in the neighborhood of 275 pounds, short and stocky, with a history of a heart lesion due to a streptococcal infection of his throat, blood-pressure of 200, and a chronic nephritis. He was taken ill with typical symptoms Sunday morning at 5 o'clock. A doctor was called, and the patient was seen regularly by the doctor once or twice a day until Thursday afternoon, at which time he was seen by me in consultation. At this time he gave a

history of having been seized with severe cramps in the abdomen which seemed to center in the pit of the stomach. During the forenoon of the same day he was nauseated and vomited. The pain and vomiting continued and on the evening of the same day his temperature rose to 101.5°F . On Monday the tenderness became more localized and the temperature continued but not so high, ranging around 99.5°F . These symptoms continued until Thursday afternoon when I saw him. At that time his abdomen was greatly distended and there was marked rigidity of the right rectus abdominis muscle. He had a leukocyte count of 18,000.

Because of his bad physical condition he was operated upon under local anesthesia using novocain as the anesthetic. The appendix was the size of a small banana, adherent to the brim of the pelvis, gangrenous and so matted to surrounding structures that it was taken out only with the greatest difficulty. The abdomen showed signs of peritonitis and contained considerable seropurulent fluid. The abdomen was drained and the patient made an uneventful recovery but remained in the hospital for six weeks.

CASE II—Mr. H. taken sick on Thursday morning at 5:30 o'clock with symptoms identical with those of the patient just described. He was under the care of a physician until Sunday afternoon when I saw him in consultation and recommended his being taken to the hospital for immediate operation.

I present here the appendix which was taken out on the fourth day after the onset of the symptoms (showing large gangrenous appendix). This speaks for itself. The interesting feature to be noted in this case is that with a history absolutely typical this patient was taken back and forth between his home and a local hospital on Saturday in a taxicab and given bismuth meals for x-ray pictures, a series of which were taken on Saturday and again on Sunday morning with this acute gangrenous mass in the abdomen which might have ruptured at any time. After operation the abdomen was drained and the patient made a good recovery though he was very ill for three or four days following the operation.

CASE III.—Mr. C., whose symptoms were practically identical with those of the two former patients, was operated on in the last part of the second day and had not been seen by a doctor until a few hours before I was called in consultation. I also show you his appendix, showing a gangrenous spot the size of a dime, which burst just after it was taken out of the abdomen. This patient made an uneventful recovery, and was discharged from the hospital within two weeks from the time of the operation, this short stay being due to the fact that it was not necessary to drain the abdomen.

CASE IV.—On the day following the operation upon Mr. C. I was called in consultation to see Mrs. N., who gave the following interesting history: Dr. F. O. Frederickson, an associate of mine, was called to see this patient at 1 o'clock in the afternoon. She complained of considerable generalized pain in the abdomen, but no nausea, vomiting, nor rise in temperature. Dr. Frederickson instructed her to call him in the event of any nausea or vomiting occurring during the night. This occurred at 8 o'clock in the evening, though the doctor was not called to see her until 9 o'clock the following morning. He immediately made a diagnosis of acute appendicitis, and ordered her sent to the hospital in an ambulance. However, his advice was not followed and the patient was brought to the hospital in a taxicab.

Upon examination, it was very apparent that the patient was suffering with acute appendicitis. With the history of the pain having lessened during the trip to the hospital, and the fact that she was able to straighten the right leg which had been drawn up during the night, I was able to make a diagnosis of a ruptured appendix, though it was only sixteen hours since the onset of the condition.

The patient was immediately taken to the operating-floor, and during the preparation, just before the anesthetic was started, the nurse reported that the patient had a very marked chill. This meant to us that contents of the appendix had broken into the peritoneal cavity at least one hour previous to this time, which was during the trip to the hospital in a taxicab.

Upon opening the abdomen free pus escaped from the peritoneal cavity. The appendix presented and was taken out. The abdomen was drained and the patient made an uneventful recovery, remaining in the hospital about five weeks.

I have described these 4 cases not because of the fact that they are uncommon or that there is anything unusual about them but rather to point out, as Dr. Murphy said to me a few weeks before his death, "it will be necessary to go over again the diagnosis and treatment of acute appendicitis. Much as we believed, fifteen years ago, that the medical men of this country had gotten hold of the subject, it is apparent that there are far too many who do not appreciate its importance, and I intend, therefore, when I get back into harness in September to write an extensive article upon the subject of the diagnosis and treatment of acute appendicitis." Let me ask here: What are the symptoms, in the order of their appearance upon which we may make an early diagnosis of acute appendicitis? First pain cramp-like in character, generalized, usually referred to the pit of the stomach, the patient usually stating that it is not an appendicitis because of the fact that the pain is not on the right side. Second, nausea or vomiting. In this connection let me ask: How many men actually determine whether the nausea or vomiting came before or after the pain? It must always follow the pain. Third, rise in temperature, which usually occurs in the first twenty-four hours. This, however, may be misleading depending entirely upon the variety of the appendicitis. Fourth, increased leukocyte count. This again may be misleading and should not be relied upon if it does not coincide with the clinical symptoms encountered. I have been in the habit for years of having a differential count made in all cases and this is especially true where the leukocyte count is low. If there is a relatively high polymorphonuclear leukocytosis, it is of significance. Later, particularly in the beginning of the second twenty-four hours, the location of the pain in the lower right quadrant becomes manifest.

As exceptions to the general rule we find a few cases in which nausea or vomiting has not been present. On the basis of a

study of several cases of this type that I have had occasion to operate on, I wish to offer an explanation of their occurrence. During the past year one of the junior residents in the surgical service at this hospital was taken ill. History of this case given in this clinic under name of Dr. M. A week before the date of my seeing him he had a streptococcic infection of the tonsils, which was carefully examined bacteriologically in the laboratory of the hospital. (Bacteriology of this case will be reported in a later clinic.) On this day, which was a week following, he was taken with acute pain in the abdomen and with all the clinical manifestations of acute appendicitis, and consequently was ordered to the operating-room. On account of the throat condition I operated under local anesthesia. The operation took place within three hours from the onset of his pain, and up to this time he had had no nausea nor vomiting. Upon reaching the appendix and making traction upon it, the patient immediately remarked, "There is the pain I have had in my stomach," referring to his stomach, and immediately began vomiting. Each time traction was made upon the appendix the pain was referred to the stomach and vomiting followed. It occurred to me, consequently, that traction upon the appendix and the mesentery of the appendix with its nerve supply might be responsible for the nausea and vomiting of the early stages of appendicitis. With this in mind, I have examined carefully the situation about the appendix in those cases upon which I have operated for appendicitis where there has been no history of nausea or vomiting. I have been able to show in at least 3 cases that the appendix and mesenterium were fixed so that practically no traction could be made upon them, and I offer this as a possible explanation of the absence of nausea and vomiting in such cases. A history of constipation ordinarily accompanies appendicitis.

The important conditions to be differentiated from acute appendicitis are: ruptured tubal pregnancy, acute gall-bladder disease, acute pancreatitis, renal or ureteral stone, and disease of the right ureter.

Ruptured Tubal Pregnancy.—History of missing menstrual

period, sudden, severe pain in lower abdomen, sharp and cutting in character, early distention of the abdomen, which is confined at first to the lower abdomen, the skin is anemic and has a deathly pallor, the extremities are cold, the surface of the body is bathed with a clammy perspiration, the face has an anxious, pinched expression and there is twitching of the facial muscles. Nausea and vomiting are common symptoms and delirium and convulsions may occur. The patient may complain of impaired vision and of ringing in the ears. There is a rapid pulse, sub-normal temperature and increased leukocyte count.

Acute Gall bladder Disease—History of typhoid or chronic appendicitis or intestinal infection, acute colicky pain in upper right quadrant of the abdomen, radiating around under the right costal arch to the back and sometimes to the right shoulder, vomiting, a history of belching of gas. Jaundice may or may not be present.

Acute Pancreatitis—Sudden onset of agonizing epigastric pain accompanied by persistent vomiting, severe collapse, weak and rapid pulse, belching and hiccups, distention of the upper abdomen due to disturbance of innervation in the transverse mesocolon, acute anemia due to hemorrhage (occasionally), grayish, pinched appearance, dyspnea has been noticed in many cases (Musser). Sugar may be found in the urine.

Stone or Disease of the Right Ureter or Kidney—Sharp pains shooting into the bladder and penis and down right leg, during severe colic great beads of perspiration come out over the body, blood or pus may be found in the urine. Ureteral catheterization, combined with use of the x ray, may clear up the diagnosis. With the patient sitting on the edge of the bed leaning forward without support the Murphy hammer stroke will elicit sharp pain if the disease is in the kidney or upper portion of the ureter.

This brief outline of the differential diagnosis of conditions simulating acute appendicitis shows how readily these conditions may be run down in the ordinary hospitals with modern laboratory methods.

I believe we cannot lay too much stress upon the value of the time element in the early hours of these diseases. I do not re-

call a single fatality in my own experience for the operative relief of acute appendicitis where I saw the case during the first twelve hours following the onset of the attack. I believe this is the experience of every operator of very wide experience. When we come to compare with this the mortality percentage of the cases that are operated on after the first twenty-four hours is there not just reason for surgeons, called upon to operate on such neglected cases, to register a firm protest against the influences which are responsible for the delay?

For many years I have used the operation made at the outer border of the right rectus muscle. In the suppurative cases with rupture we attempt to remove the appendix in the large majority of cases if the appendix presents. However, this is done with the utmost care respecting the surrounding viscera. We practically never do more than drain a case of this type if it appears that we shall not be able to go down upon the appendix and remove it without disseminating the infection about the field of operation. I am of the opinion that the recovery is much more rapid and complications much less frequent where the ruptured appendix is removed.

CLINIC OF DR. HARRY E. MOCK

ST. LUKE'S HOSPITAL

A CASE OF BICHLORID OF MERCURY POISONING DIAGNOSED AS, AND OPERATED ON FOR, PERFORATED GASTRIC ULCER

ALTHOUGH I cannot demonstrate this patient to you, I wish to recite the circumstances of his illness because of the unusual coincidence of symptoms which caused a diagnosis of perforated gastric ulcer to be made, when the existing condition was finally proved to be that of bichlorid of mercury poisoning.

Dr. W., fifty-eight years old, who had been a practising physician until ten years ago, was admitted to the Surgical Service of St. Luke's Hospital on December 9, 1916, at 8 p. m.

On admission the patient was suffering from acute abdominal pain, hematemesis, and hiccoughs. He was in a semi-comatose condition. The history of his sickness was obtained from his wife, who was a graduate nurse. She stated that ten days ago the patient began to vomit and complain of epigastric pain. The next day he vomited considerable blood, and this vomiting of blood had occurred at two- or three-day intervals until this day, when he vomited blood several times. The abdominal pain became very intense on December 9th. Blood had been present in the stools since the first attack of hematemesis.

Five days previous to his taking sick, or on December 4th and 5th, there was complete suppression of urine for forty-eight hours. The flow of urine had been fairly good until the day of admission, when it again became scanty. A urinalysis made on December 6th showed albumin, hyaline casts, and blood, according to the wife's statement.

for a complete study, and the patient was, therefore, transferred to the medical service of Dr. Charles Elliott.

The epigastric pain and rigidity increased considerably and the vomiting of blood became more profuse. A second blood examination taken two hours after admission gave a leukocyte count of 42,000, and an hour later the leukocyte count had reached 54,000.

A diagnosis of perforated gastric ulcer was made, and I was called at 11.30 to operate on the patient. My examination confirmed the diagnosis, and the patient was operated on immediately.

An ether anesthetic was administered, 4 ounces being used altogether. The abdomen was entered through a right rectus incision. The gall-bladder was found greatly dilated, but contained no stones. The stomach and duodenum were carefully examined, but no sign of an ulcer could be found. Exploration of the intestines failed to reveal any pathology. The appendix was slightly enlarged, but not inflamed. The pancreas seemed slightly enlarged and harder than normal. The omentum and the mesenteric lymph-glands and the liver were perfectly normal. The right kidney was enlarged. The appendix was removed and the gall-bladder opened and drained. This was done, first, because of the dilated condition of the gall-bladder, and, second, so that the patient could be fed through the gall-bladder, as advocated by Dr. McArthur. The abdomen was closed in layers.

The patient died fourteen hours after the operation. The autopsy revealed a consolidated area in the right lower lobe of the lung; enlarged kidneys, with marked hemorrhagic, inflammatory changes. The stomach and the duodenum were entirely negative, but the esophagus showed numerous areas of petechial hemorrhages. The ascending and transverse colon showed many small ulcers. The autopsy diagnosis made by Dr. Adelbert Moody was lobar pneumonia, acute hemorrhagic nephritis, and ulcerative colitis.

The autopsy findings did not account for the acute abdominal symptoms and the excessive hematemesis, which had been the prominent features in this case.

Fortunately, the esophagus, stomach, and colon had been saved from the autopsy. At the suggestion of Dr. E. R. LeCount, consulting pathologist to the hospital, these organs were turned over to the Coroner's Office for chemical examination.

This chemical examination revealed bichlorid of mercury present in sufficient quantity to cause death. Further investigation by the Coroner's Office failed to reveal how or when the patient took the bichlorid of mercury. His wife gave the additional information that Dr. W. had attempted suicide six months previously by gas poisoning. The case was signed out as suicide by bichlorid of mercury poisoning.

CLINIC OF DR. DAVID C. STRAUS

MICHAEL REESE HOSPITAL

HAMMER-TOE

Summary A case of hammer-toe of the right great toe purposely produced in order to avoid military service, etiology, pathologic anatomy, and clinical types of hammer-toe; treatment—the Thilo insole and the Ernst splint; operative measures—the Jones operation, amputation unjustified as a rule, procedure and results in the present case.

THIS case is of interest not only because it is unusual to see hammer-toe of the great toe only, but because of its unique etiology, the conservative operative treatment, and the satisfactory cosmetic result.

The patient, a Russian, thirty-eight years of age, entered the Michael Reese Hospital to be relieved of a hammer-toe of his right great toe because it caused him considerable discomfort in walking. Whenever he was on his feet much he would have pain at the tip of the toe and also over the head of the first phalanx. He did not wish to have the toe amputated, but insisted that he must have relief and was willing to submit to amputation if that were necessary.

Examination of his feet showed that the right great toe was the only toe affected. The other toes were normal and well shaped. This made the deformity of the right great toe all the more striking. The first phalanx of this toe was hyperextended, while the second phalanx was strongly flexed at the interphalangeal articulation, so that the patient bore his weight on the tip of the toe in walking (Fig. 401). There was a hard corn over the most prominent point of the dorsal surface of the head of the first phalanx where this prominent knuckle sustained the pressure from the shoe, and a hard callus at the tip of the toe.

The interphalangeal joint was ankylosed. As the only similar hammer toe I had seen was in another Russian I surprised the patient when I asked him if he had not had the deformity produced artificially while in Russia. He smiled and admitted that he had, eleven years ago to escape military service. He said that a great many men in his part of the country had had this deformity produced to avoid having to serve in the army and that there were medical men who made a regular practice of



Fig. 401—Artificially produced hammer toe of the right great toe only. Roentgenogram—lateral view. The distal phalanx stands at right angles to the proximal phalanx. The head of the distal phalanx is flattened from pressure in walking. The head of the proximal phalanx is greatly deformed.

performing the operation. The operation consisted in making a transverse incision across the plantar surface of the toe through the interphalangeal articulation, hyperflexing the joint, and immobilizing the toe in this position by means of a splint which was left in place for about a month or until healing occurred. In his own case three days after the operation to produce the deformity the joint became infected and there was a discharge of pus from a small opening over the dorsal surface of the joint. This persisted as a sinus for three weeks. Then healing occurred.

Later the hard corn developed at the site of this perforation and has persisted ever since. This he regularly trimmed down, as it otherwise caused him great pain. He now demands that he be cured of his deformity.

Hammer-toe is a deformity of the toes which consists of dorsiflexion of the first phalanx and plantar hyperflexion of the second phalanx. In toes with three phalanges the position of the third phalanx varies—it may have the same direction as the second or it may be bent dorsally or plantarward.



Fig. 402.—Artificially produced hammer-toe. Roentgenogram—dorsoventral view.

The deformity is congenital in some cases. Heredity plays a more important part in this deformity than in any other deformity of the foot, and Anderson has traced it to heredity in at least a fourth of his cases.¹ As a rule, however, it is acquired, and usually results from the wearing of shoes that are too short, and is often associated with, and hence may be secondary to, hallux valgus. Rarely it may be due to a contraction of the plantar fascia, and it is then associated with pes cavus and talipes equinus.

The deformity most often affects the second toe with or without the others but it is uncommon for the great toe to be thus deformed. The condition is frequently bilateral.

Occasionally the great toe alone may be affected. As a rule then the interphalangeal joint is flexed. However it may be hyperextended and in such cases the flexion contracture is in the metatarsophalangeal articulation.

Nicolaïdoni described a rare deformity of the foot which he called hammer toe flat foot (*pes malleus valgus*). The great toe is flexed at right angles at the metatarsophalangeal articulation and there is a rigid flat foot. Later Rinneft Kirsch Hofmann and Vulpius described hammer toe formation with adduction position of the great toe (*hallux malleus varus*) associated with rigid flat foot. While according to these authors the second and third toes are likewise held in the adducted position the deformity is most marked in the great toe. The anterior portion of the foot is supinated and the arch of the foot is sunken (club toe flat foot). Some authors assume that in these cases the flat foot is a result of the contracture of the toes. On the contrary Borchardt¹ agrees with Hofmann in believing that hammer toe is a position of relief in the case of painful conditions of the leg and foot (flat foot affections of the knee scars on the foot etc.) which at first is only temporary but later becomes permanent. Rubritius also believes this position of the toes is an anatomic compensation deformity of flat foot. Treatment therefore under such circumstances must be directed toward the correction of the flat foot. The correction of the deformity of the toes is of only secondary importance.

Slight grades of hammer toe cause the patient no discomfort. When a patient comes to the surgeon because of a hammer toe it is usually one of high grade and in such cases there is usually a painful corn or callus over the head of the first phalanx and a painful corn or callus at the tip of the toe. In addition there is usually a painful callus on the plantar surface of the foot over the head of the metatarsal bone. There is frequently also a subcutaneous adventitious bursa over the head of the first

¹Handbuch der Praktischen Chirurgie 1914 vol v p 1231

phalanx beneath the ever-present callus. This bursa is usually painful, may become fistulous, and may communicate with the joint. The condition, therefore, may become so painful that the patient is unable to wear a shoe.

Shattuck and Adams point out that, whatever the original cause may be, the chief obstacles to reduction are the shortened lateral ligaments and the contracted capsular ligament. Although the flexor and extensor tendons are contracted, division of them alone is not sufficient to remove the deformity. The lateral ligaments must be divided.

If inflammation extends from the bursa to the joint there may be ankylosis between the first and second phalanges.

In regard to *treatment*, in *slight cases*, where the second toe alone is affected, attention to the shoes and the various measures for correcting the hallux valgus are of value, especially if, in addition, the deformed toe is straightened manually several times every night and morning. When all the toes are slightly affected sandals are generally recommended, the individual toes being bound down by separate elastic loops. For these cases, too, the insole suggested by Thilo is worthy of mention. This is made of firm sole-leather. Holding the foot on this leather insole one draws the outlines of the affected toes. Midway between the two margins of each affected toe—that is, in a line corresponding to the long axis of the toe—two holes are drilled through the entire thickness of the insole, one near the proximal and one near the distal extremity of the toe, so that these holes lie approximately $1\frac{1}{2}$ cm. apart. A string or thin tape is placed along the axis of the plantar surface of the affected toe and the two are bound together with adhesive plaster. The ends of the tape are drawn through the holes beneath the toe and knotted on the under surface of the insole. The stocking is put on over this and the shoe worn.

In case a *single toe is affected* this same device may be used or the T-spring devised by Ernst. This is a metal splint, suitably padded, made in the form of a letter T. The horizontal bar of the T fits across the sole of the foot, and is held in place by a band that passes over the dorsum of the foot. The vertical

part of the T is made correspondingly smaller and lighter, and extends along the plantar surface of the deformed toe, which is extended and bound down upon it. Lange¹ has suggested an insole, similar to the Thilo insole, except that it extends over the anterior part of the foot only, and Jones uses a short splint somewhat similar to the Ernst idea. The stocking is put on over all these.

In cases that are *slightly more advanced* it may be necessary to forcibly correct the deformity under an anesthetic before applying one of the splints just mentioned. A distinct snap or crack is felt when the lateral ligaments give way.

In cases in which *the deformity is marked, and in the adult when a rapid and lasting cure is desired, one must resort to operation.*

W. Adams and also Tubby² have had good results from *subcutaneous division of the ligaments*. A tenotomy knife is introduced through the skin crease on the plantar surface of the toe, beneath the first interphalangeal articulation. The knife is passed upward, beneath the skin, avoiding the digital vessels and nerves, and the edge is then turned toward the bone and the lateral ligaments divided. Continuing the division on the plantar surface of the joint, the flexor tendons and capsular ligament are divided, and then, without withdrawing the knife, *the remaining lateral ligament is similarly divided, cutting toward the bone, as before.* The toe can usually now be easily straightened, and any remaining fibers are forcibly ruptured if necessary. In some cases it is necessary, in addition, to divide the contracted extensor tendon. The toe is then put up on a splint until healing has occurred, after which a T-splint is worn until the deformity shows no tendency to recur.

The same result has been obtained by an open operation on the plantar surface of the toe, dividing all the soft structures, skin, tendons, and joint-capsule until the toe can be extended. This is known as Peterson's operation, and has been strongly recommended by Hoffa. The toe is then immobilized in the

¹ Centralbl. f. orth. Chir., 1911.

² Deformities, Including Diseases of the Bones and Joints, 1912, vol. 1, p. 365.

corrected position for three to four weeks. This gives good results in some cases, but where the deformity has been great recurrence frequently follows. For this reason the operation has been largely abandoned.

Resection of the first interphalangeal articulation is to be recommended instead. This is probably the *operation of choice* in most cases. It may be performed through a plantar incision to one side of the flexor tendon, as recommended by Albee, or through a dorsal incision. Binnie prefers a lateral incision, although he admits that this makes the operation more difficult.

Arthroplasty has been suggested, but is not to be advised.

Some surgeons, in order to obtain a new joint, leave the articular cartilage on one side of the joint. Jones in a recent article¹ states that no attempt to produce a pseudo-arthritis at the proximal interphalangeal articulation should ever be undertaken; that this operation should be condemned as uncertain, for his experience has been that it is very frequently followed by recurrence.

In the case I am presenting I removed the head of the first phalanx, and left the base of the second phalanx intact, but I did not do this with the idea of obtaining a movable joint. In this case the joint was ankylosed as the result of the old suppurative arthritis. As the head of the first phalanx was greatly deformed (see Fig. 401) a great deal of the first phalanx had to be removed, whereas the base of the second phalanx was fairly normal, and was, therefore, saved to give sufficient length to the toe. No attempt was made to obtain a movable articulation, nor was one anticipated.

Jones² finds the following operation most uniformly satisfactory; "A wedge-shaped excision (Fig. 403), removing the articular cartilage on both sides of the joint, so as definitely to ankylose the joint in extension. An oval piece of skin, including the corn, is excised over the prominent knuckle. A wedge, base upward, including the joint, is then excised, of sufficient size to allow the toe to be straightened. The flexor tendon is

¹The British Medical Journal, June 3, 1916, p. 782.

²Ibid.

divided by tenotomy. The skin incision is then stitched so as to leave a transverse linear scar. The toe is fixed down to the toe-splint and the patient walks about, still wearing the splint inside his boots for some weeks to make sure that solid ankylosis occurs without any return of the deformity.

In some cases *exarticulation* or *amputation* of the deformed toe is the most logical procedure. *Amputation should be avoided wherever possible*, and one important point must con-

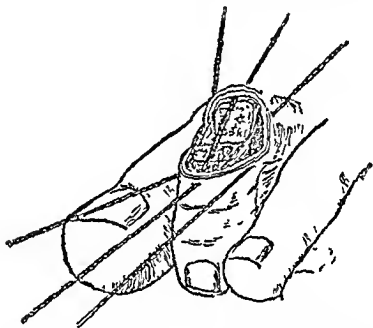


Fig. 403 — Jones' operation for hammer toe: wedge excision of the interphalangeal articulation to produce ankylosis in corrected position.

stantly be borne in mind in this connection. If the second toe is removed, the tendency to the production of a hallux valgus is greatly increased, and often leads to a second disability more serious than the original hammer toe. The indiscriminate amputation of toes for hammer toe is certainly to be condemned. Jones even goes so far as to say that amputation should never be done.

To return to the case under discussion, the operation was

performed as follows: After the usual preparation, and under gas-ether anesthesia, an incision was made parallel to and just to the lateral side of the tendon of the extensor pollicis longus, on the dorsal surface of the right great toe, the incision extending from the middle of the first phalanx to the middle of the second phalanx. The incision was placed to the lateral side of the tendon so that the scar would not be subject to shoe-pressure. The above-mentioned tendon was next exposed and dissected free from the joint capsule to which it was adherent as the result



Fig. 404 — Photograph after operation. Note that the line of incision is to the lateral side of the dorsal surface of the great toe so as to avoid pressure from the shoe. Only the proximal part of the incision is to be made out. The distal portion of the incision does not show in the photograph.

of the original operative infection. In separating the tendon from the joint capsule it was necessary to divide the capsule. Next, the soft parts were separated from all adherent tissue to the first phalanx, using a periosteal elevator to separate the tendon and then the elevator was left *in situ*, to hold the tendon free from the bone. Now the joint was opened or, rather, the articular surfaces were dissected apart, for, due to the old ankylosis of the joint at the time of the original operation, the joint was in partial bony ankylosis of the joint. The head of the metatarsal was now extended strongly upward, so that it

the skin incision and was accessible for the saw. With a Payr arthroplasty saw the head of the first phalanx was cut away removing a fairly large piece of the phalanx with it. The second phalanx could now be easily extended without any force and tended to remain straight showing no tendency to flex again. The sawn surface had purposely been made curved to simulate the head of the bone. Now the joint capsule and the divided tendon together were sutured with interrupted stitches of kangaroo tendon to close the joint capsule and repair the divided extensor tendon by this means the ends of the two phalanges were held in accurate approximation and the toe was held straight. As both joint surfaces presented freshened bone bony ankylosis was expected. Finally the skin was closed using continuous and interrupted stitches of black waxed silk.

A dry dressing was put on and a plantar splint was applied to hold the toe slightly in extension.

The wound healed by primary union and the patient was allowed to walk on the twenty second day after the operation. I was surprised to find that there was some motion in the interphalangeal articulation. Today twenty five days after the operation you see that the patient who is now prepared to depart from the hospital has a straight movable painless useful toe (Fig 404) in place of the incapacitating deformity with which he came to us.

HAMMER-TOE—MODIFIED JONES' OPERATION WITH DETAILS OF THE TECHNIC

THIS patient, a girl of sixteen, comes to the hospital because of pain in the right second toe, which is deformed. She states that the deformity began about one year ago, after she bumped the toe against a rock while in swimming.

The foot has been prepared for operation. You will notice that the other toes are all normal, though the distal phalanx of the right great toe curves upward somewhat. The second toe,



Fig. 405—Hammer-toe of one year's duration in a girl of sixteen, who developed the deformity after bumping the toe against a rock while in swimming. Note the corn over the head of the first phalanx. The patient comes for operation because of pain. Photograph before operation. Anterior view

as you see, shows the typical picture of a hammer-toe (Fig. 405), the proximal phalanx being strongly flexed upward and the second phalanx being acutely flexed plantarward, so that the head of the proximal phalanx projects strongly upward above the level of the other toes. As is the rule, also, you see there is a corn over the head of the proximal phalanx. In this case the corn is unusually large (Fig. 406). The third phalanx is ex-

tended in relation to the second phalanx so that she does not bear her weight on the tip of this toe as is so often the case.

I have explained to the patient that I shall attempt to correct the deformity by removing the affected joint but will probably not have to amputate the toe and shall not do this unless it is absolutely unavoidable. As I explained when I showed you the other case of hammer toe one should never amputate a hammer toe unless all other operations are obviously impracticable and this is seldom the case. There is no ballux valgus in this case but if the deformed toe were to be ampu



Fig. 40b—Photograph before operation. Lateral view. This shows the corn over the head of the first phalanx very plainly.

tated one would certainly develop and this would leave the foot more deformed than it now is and would cripple the patient more than the hammer toe does. I shall perform a Jones operation in order to show you how simple it is though I shall modify his technic slightly.

As I described this technic in detail when I showed you the first case I need not repeat it now (see page 1089).

Operation—The first step in this operation consists in excising the corn over the head of the first phalanx by means of an elliptic incision carried just beyond the corn being careful not

to extend the incision far enough lateralward on either side to cut the digital vessels. These do not come into view. In doing this, you see, I carry the incision boldly down to the bone, as there are no structures to be preserved. There is a bursa beneath the corn, and this I have excised together with the corn. The bursa does not communicate with the joint as is frequently the case. With a small thin periosteal elevator, curved so as to conform to the bone, I am *freecing* the soft parts from the bone all around the interphalangeal articulation, taking great care not to injure the digital vessels or the flexor tendon. Jones, in his description of his operation, says that the interphalangeal joint is resected by a wedge-shaped excision. I shall open the joint in this case, completely divide the capsular ligament and both lateral ligaments, and then shall separately resect the base of the second phalanx and the articular portion of the head of the first phalanx. You see that I am now dividing the dorsal portion of the joint capsule. In dividing the lateral portion of the capsule and the lateral ligaments I am very careful not to cut the digital vessels, and in order to avoid injuring them I direct the scalpel always toward the bone, and use the periosteal elevator as a retractor to hold the soft parts away from the joint. I am not going to divide the flexor tendon as Jones does, because in this case I believe after I have resected the ends of the bones I shall be able to straighten the toe without doing this, and that the flexion deformity will not tend to recur. I also feel that the flexor tendon will act somewhat as a splint, so that the joint will not be too flail-like.

Now that the two bones are free, I shall resect the joint surface of each bone in turn, removing the cartilage and only a thin layer of bone, so that the toe will not be too short. I shall first resect the base of the second phalanx and then the head of the first phalanx. In order to make the base of the phalanx accessible to the saw I dislocate it upward through my original incision, protecting the soft parts by retracting them downward and lateralward. I shall now resect the articular surface of the head of the proximal phalanx in a similar manner, at the same time holding down the distal portion of the toe to give better exposure.

Now that the articular surfaces are cut away, you see the toe can be straightened and remains straight. The flexion deformity does not tend to recur. The operation is practically bloodless and no arteries need to be ligated. Instead of using three sutures going through all the soft parts as Jones does in his closure I shall suture the deep tissues and the skin separately. I put in all my deep sutures before I tie any of them. I shall now suture together the two cut ends of the extensor tendon. I shall first put in a mattress suture of No. 2 chromic catgut to unite the cut ends of the extensor tendon, beginning at the proximal end. I

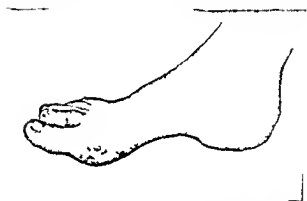


Fig. 407.—Photograph of the same case four days after a somewhat modified Jones operation. Note the line of incision and the interrupted sutures still in place. Primary union. As a result of the resection the second toe is shorter than the middle toe and is just about the same length as the fourth toe. There is no hallux valgus and none will develop as would happen in case the deformed toe had been amputated.

shall now put in an interrupted chromic catgut stitch at either side of the mattress suture. In addition I shall put one interrupted chromic catgut stitch through the soft parts at either side of the tendon to take the place of the lateral ligaments, taking care to grasp in the bite the fibrous tissue and periosteum. I shall now tie each of these sutures. You see that when these are tied the distal portion of the toe is held straight and firmly in contact with the proximal part of the toe. I shall now put in the skin sutures. I shall first put in a few interrupted stitches of No. 3 black waxed silk. These three will suffice. Now I shall

put in, in addition, one interrupted stitch of No. 1 plain catgut between each of these silk stitches. These six stitches are all that are required, and, as you see, the apposition is accurate and the toe looks fairly normal. I shall now put on a simple dressing of plain gauze, and shall hold the toe immobilized on this small splint of the Jones type, which I described when I showed you the previous case. If the patient has no rise in temperature or no unusual amount of pain in the toe the dressings may be left in place for eight or ten days without inspecting the wound, and at the end of this time the silk stitches will be removed. The patient will not be allowed to walk until the end of three weeks.

Postscript.—In this case the dressings were removed on the fourth day in order to take a photograph to show the incision and the sutures in place (Fig. 407).



CLINIC OF DR. KELLOGG SPEED

COOK COUNTY HOSPITAL

HEMATURIA IN APPENDICITIS

Summary—Hematuria in 7 out of 13 male patients with appendicitis; other reported cases; possible causes of the condition; importance of a local ureteritis, diagnosis, sequelae—possibility of organic ureteral stricture.

MEDICAL teaching has always laid stress on the importance of hematuria in calculus of the urinary tract or in lesions involving solely the genito-urinary system. In the last two months I have had 13 male patients admitted to my service with a diagnosis of an acute or subacute appendicitis. All have been operated on and, of course, all have been given the customary careful urinary examination. This examination must always include microscopic inspection. Seven of these patients have presented blood in the urine at the time of admission, and the prevalence of this finding in appendicitis warrants my calling it to your attention. I can only show you one of these patients (Case I); nevertheless I shall present to you the essential facts concerning each of the remaining six as I find them in the hospital records.

CASE I.—This man is twenty-seven years old. He entered the hospital with the customary history of an acute attack of right-sided abdominal pain preceded one week by a cold, chest pains, and a cough. The first abdominal distress was epigastric, but it moved down quickly to the right iliac region, and in the afternoon of the first day the pain radiated down into the right side of the scrotum, causing the patient to double up. There was no previous history referable to the urinary tract except that he recalled passing bloody urine for about a week when eight years old. Kidneys not palpable or tender; muscular rigidity low down in right iliac fossa.

On admission the urine showed 100 red-blood corpuscles to a low-power field, a few white blood-corpuscles, and hyaline

casts with debris albumin a trace Leukocyte count 11,700 Just before operation another urine examination was made which confirmed the finding of red cells in an acid urine After appendectomy the hematuria promptly ceased

Operative Pathology—A subacute rigid, and thickened appendix was found buried deeply in the iliac fossa No peritonitis, but the serosa of the cecum was injected and the sigmoid had moved over on to the right side

CASE II—F S, No 624 670 twenty four years old entered February 14 1917, discharged March 3 1917 He gave the customary history of onset with no previous trouble The first pain was low down on the right side He had worked and been quite constipated A mass could be felt in the right iliac region, and the rigidity and tenderness there present extended back into the lumbar region *Genito-urinary history negative*

Urine examination showed 200 red blood corpuscles to a low power field, alkaline reaction, no albumin and a small amount of debris present Leukocyte count 12 400

Operative Pathology—A retrocecal appendix was found lying in a small abscess walled off by bowel and omentum The appendix was gangrenous with inflammation of the surrounding intestinal surfaces Appendectomy and drainage, followed by prompt disappearance of the hematuria

CASE III—M Z, twenty two years old admitted February 21 1917, discharged March 5 1917 Customary pain history with constipation He had been sick really about four weeks but did not vomit The appendix region was quite sore and there were no symptoms in the urinary tract The urine showed acid no casts numerous red blood cells and a few white blood cells Leukocyte count 8600

Operative Pathology—The appendix was fixed anteriorly by a few thin adhesive bands The organ was long and indurated moderately inflamed, its base lying low down and far back, much thickened

After appendectomy the hematuria disappeared

CASE IV—F D, fifty-one years old, admitted January 11 1917 discharged two weeks later Readmitted January 29 1917

His attack consisted of right iliac pain and dizziness with a negative previous history. Four days before admission he had been seized with a severe pain in the right abdomen which occasionally passed into the right testis. He vomited, and after two days the pain gradually subsided, but tenderness on the right side persisted. Just before admission the pain had begun again, extending into the right testis and lumbar region, with subsequent vomiting. He had fever in both attacks, with chills in the last. Urination was regular and normal and no blood was noticed in the urine. Gonorrhea twenty-five years ago.

The urine showed acid, no albumin, 50 red blood-corpuscles to each low-power field, and a few white blood-cells. Leukocyte count, 11,600.

Operative Pathology.—Appendectomy. Subacute catarrhal appendicitis, erectile type. The tip of the appendix was retrocecal. The mucosa was deeply injected and there was no pus or fecolith present.

He recovered symptomatically and was discharged, hematuria having disappeared.

Readmitted, saying that four days after leaving the hospital he had been seized again with the same severe attack of pain in the right side. This radiated to the left side and not downward. Nausea, vomiting, and fever of 100.4° F., with sweats and chills present. Rarely the pain could be felt in the scrotum and there was marked tenderness in the lower right abdomen. When deep pressure was made over the right kidney, pain, radiating into the left side of the abdomen, developed. Wound clean, healed, and not tender. One could not be certain that the right kidney was palpable.

Urine examination: Acid, no albumin, a few white blood-cells. Stomach contents and feces negative. Because he had slightly irregular pupils a Wasserman was made. It was negative.

Cystoscopic examination January 31, 1917: The posterior urethra was somewhat lengthened, the bladder mucosa showed no change, and was very tolerant to both fluid and instrument. Ureteral orifices—catheter passed to left kidney, but ureter did

not allow entirely free passage Left orifice—no change Right orifice showed an increase of blood vessels and a distinct blush of the mucous membrane inferiorly On attempted catheterization the catheter would pass up only 1 cm Filiforms and numbers 4 5 or 6 would not pass The conclusion was drawn that the ureter was markedly spastic or that an organic obstruction was present The appearance of the orifice was not at all suggestive of foreign body there being no edema or orificial elevation

Rest in bed with active catharsis was ordered By February 2 1917 a No 6 catheter could be passed to the pelvis of the right kidney meeting with no serious obstruction No stone was found or passed The patient was discharged February 19 1917 free from pain and improved No hematuria the ureteral stricture being probably secondary to the perityphlic inflammatory process

CASE V—A N No 620 245 eighteen years old admitted January 4 1917 discharged January 19 1917 He had the customary history of right sided pain with sudden onset first in the epigastrium followed by vomiting and localization in the right flank This was the first attack the previous history being negative On the right side the muscles were very rigid and there was tenderness in an area the size of one's palm over the usual appendix region Considerable rigidity extending into the right lumbar region Kidneys negative

Urine examination Acid no albumin fair number of both red and white blood corpuscles Leukocyte count 16 600

Operative Pathology—The appendix suppurating and gangrenous at tip lying deeply behind cecum was delivered with difficulty Just beyond edge of mesentericocolum was a small perforation No fecal concretion in the lumen but there were several deep ulcers present Diffuse serofibinous and purulent peritonitis with no attempt at walling off by surrounding viscera Appendectomy and drainage

Urine examination three days later showed alkaline reaction otherwise negative Hematuria and other symptoms remained negative until discharged

CASE VI.—M. G., No. 622,455, thirty-three years old, admitted January 25, 1917; discharged February 14, 1917. He told a story of dull aching pain at the pit of the epigastrium and right side of abdomen, with a poor appetite and loss of weight. Three months before admission he had experienced a sharp attack which doubled him up, caused vomiting, and sweats lasting three days. His abdomen remained tender, and one month before coming to the hospital he had a second attack of four days' duration. Past history was negative. Genito-urinary symptoms entirely negative. A small mass could be felt low down in the right flank and the rectal examination showed a slightly enlarged prostate.

Urine examination showed an alkaline reaction, trace of albumin, 30 red blood-corpuscles to $\frac{1}{4}$ field, and a few white blood-cells. Leukocyte count, 9000.

Operative Pathology.—An abscess of thin fetid pus was found deep down around the head of the cecum which was fairly well walled off by the injected bowel. No general peritonitis existed. The appendix could not be located. Drainage. A fecal fistula developed, but rapidly closed. Inside of three days after operation blood disappeared from the urine and was not found subsequently.

CASE VII.—F. C., No. 622,684, twenty years old, admitted January 27, 1917; discharged February 11, 1917. Sudden onset with right abdominal cramp-like pain. Previous history negative except for a specific urethritis a few months ago. Urine acid; albumin, trace; 10 red blood-corpuscles and about 50 white blood-corpuscles to $\frac{1}{4}$ field. Leukocytes, 34,000.

Operative Pathology.—There was a deep lying partially gangrenous appendix surrounded by a walled-off abscess cavity. Appendectomy and drainage.

Following operation the hematuria disappeared and there were no signs of an active urethritis.

Hematuria, after all, may not be so uncommon in appendiceal attacks. Noble in 1897 (*Annals of Surgery*, xxv, 187) reported an instance in which the ureter was involved in appendiceal inflammation. The patient, a twenty-three-year-old male, had an attack simulating renal colic, in which there was nausea,

vomiting and retraction of the right testicle but no hematuria nor was calculus passed, although there was three years' observation. Attacks happened every two or three months and eventually stone in the pelvis of the kidney was diagnosed. The kidney was opened, but no stone was found. The operator's finger passed down the ureter felt a thickened mass, and through a separate abdominal incision a long thick appendix which pointed up and backward, with its tip adherent to the posterior peritoneum over the right ureter, was found. This was removed and the colic ceased. Tuffier in 1899 (*Semaine Med* 1899, 265) cited an instance of similar attacks of three years' duration in which he found a long standing appendicular inflammation which had caused an intimate fusion to the right ureter. Appendectomy effected a cure. Thorburn (*Med Chron*, 1901, 116) reported 2 instances of appendicitis with hematuria in boys aged fourteen and nine years. One had abdominal fecal fistula, the other a large abscess and in both the severe hematuria disappeared after operative interference. He thought that the large mass of the appendiceal abscess might cause hematuria by pressure on the renal vein. Gardini (*Gazz d Ospedali e d Chiriche*, Milano, 1902 567) mentioned 2 patients in whom diagnosis was difficult, both with hematuria but both later passing stones. Baradulin (*Moscow Monatsberichte f Urologie*, 1904, 703) discussed this subject, but considered that the proximity of the appendix to the bladder was the cause of most hematuria in appendicitis.

The causes of appendicular hematuria may be briefly outlined as follows

I Local

- (a) *Perc ureteritis* in appendiceal area—hyperemia of mucosa with blood leakage into urinary stream
- (b) *True ureteritis* from direct extension. Appendix chronically adherent to ureter or ulcerated into ureter by abscess or intense neighboring inflammation
- (c) *Pericystitis*—appendix near to bladder wall—same pathology as (a)
- (d) *True cystitis* from extension as in (b)

II. General—dependent on the appendicular inflammation:

- (a) Septic infarcts in kidney, ureter, bladder, or prostate.
- (b) Toxic hematuria.
- (c) Lighting up of old urethritis or cystitis by acute febrile attack.

Any of these causes may act. I believe that the majority of the instances of bloody urine in appendicitis can be traced to the local peri- and true ureteritis. Most of the patients mentioned here were not intensely toxic. Only one had suffered a recent urethritis and the appendices were mostly deep and adherent over the ureteral course. I have had several patients with masses of abscess or inflammation palpable via the rectum, some with an appendix adherent to the bladder wall, but all without hematuria. Not one of this series of 7 patients gave evidence of septic kidney infarcts, and in the one cystoscopically examined the bladder mucosa was normal. The prompt recovery after appendectomy proves rather conclusively that local ureteritis is the cause of most of these attacks of hematuria accompanying the appendicitis.

Diagnosis must consider, of course, kidney and ureteral stone and new growths, cystitis and pericystitis, abscess rupturing into the bladder, stone and new growths in the bladder, as well as prostatic, seminal, and urethral lesions. Cystoscopy is of great help.

As a rule we may consider that the sequelæ are of little danger. Patient No. 4, cited here, probably developed a ureteral stricture of very mild degree from the inflammation. The condition may have been merely spasm, but the obstruction felt organic. Ulceration of the ureteral wall might lead to urinary extravasation into the peri-appendiceal area or abscess, to be followed by a urinary fistula when the abscess is opened. We know clinically, however, that wounds of the ureter tend to close naturally in a brief time if given half a chance. I cannot recall having heard of an instance of urinary fistula following the opening of an appendiceal abscess, although infections of the kidney, ureter, or bladder are possible following such a lesion and do sometimes occur.



